

# EMERGENCY MEDICAL SERVICES PRE-HOSPITAL TREATMENT APPENDIX

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COMPLETE TEXT

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## ~ ~ ~ APPENDIX A - MEDICATIONS LIST ~ ~ ~

### MEDICATIONS LIST FOR STATEWIDE TREATMENT PROTOCOLS

#### Required Medications:

Activated Charcoal	Furosemide (Lasix)
Adenosine (Adenocard)	Glucagon; Oral glucose (Glucola, Intra-glucose)
Albuterol (Proventil, Ventolin)	Lidocaine
Aspirin	Magnesium Sulfate
Atropine	Midazolam (Versed)
Atrovent Inhalation Aerosol	Morphine Sulfate
Calcium Chloride	Naloxone(Narcan)
Cetacaine Spray, Neo-Syneprine Spray, OR	Nitroglycerin (Nitrostat)
2% Lidocaine Jelly	Nitropaste (Nitro-Bid ointment)
(To assist with nasotracheal intubation)	Oxygen
Dextrose D10, D25, and D50	Saline Flush
Diazepam (Valium)	Sodium Bicarbonate
Diltiazem HCL (Cardizem, LyoJect)	Terbutaline (Brethine) (subcutaneous)
Diphenhydramine (Benadryl)	Thiamine
Dopamine (Intropin)	IV Solutions (NS).
Epinephrine (Adrenalin) (1:1000 and 1:10,000)	
Epi-Pen	

**Interfacility Transfer Medications (in addition to required medications):** Aminophylline drips; Intravenous Antibiotics; 10% Dextrose (D10); Intravenous Diltiazem infusions; Dobutamine (Dobutrex); Glycoprotein IIb / IIIa Inhibitors(Abciximab, Eptifibatide, Tirofiban) Intravenous Heparin; Insulin infusion (patients with DKA); Magnesium infusions; Mannitol infusions; Meperidine (Demerol); Midazolam (Versed); Morphine Sulfate infusions; Nitroglycerin infusion; Nitropaste(Nitro-Bid ointment); Potassium Chloride infusions; Procainamide (Pronestyl), *Sodium Bicarbonate Infusions*, Intravenous Steroids (Methylprednisolone; Solu-Cortef, etc.); Standard IV infusion fluids (1/2 NS, D5 1/2 NS, D5 1/4 NS, D5, LR, etc.); Total Parenteral Nutrition (TPN) (Central or peripheral IV lines).

**NOTE: Although the sending facility may have initiated medication(s), Paramedics MUST be familiar with all of the above medications that the patient may be receiving at the time of transfer. Reminder: interfacility medications are not to be initiated by Paramedics (except under special project waiver).**

#### Optional Medications:

Amiodarone (Cordarone)	Pralidoxime (2-PAM)
Cyanide Antidote Kit (Amyl Nitrite, Sodium Nitrite, Sodium Thiosulfate)	Tetracaine
Lorazepam (Ativan)	IV solutions (D5W and LR)
Metoprolol (Lopressor)	
<b><u>Nerve Agent Antidotes- (Autoinjectors)</u></b>	

## APPENDIX B

# COMFORT CARE / DNR ORDER VERIFICATION PROTOCOL

### INTRODUCTION

Emergency medical services (EMS) personnel (refers collectively to Emergency Medical Technicians - EMTs and First Responders) are required to provide emergency care and to transport patients to appropriate medical facilities. EMS personnel are further required to provide treatment to the fullest extent possible, subject to their level of training. However, more and more patients, where it is medically appropriate, are opting not to be resuscitated. Many patients arrange with their physician, nurse practitioner or physician's assistant<sup>1</sup> for Do Not Resuscitate (DNR) orders; an order directing that the individual not be resuscitated in the event of cardiac or respiratory arrest. However, since there is currently no uniform mechanism to enable EMS personnel to recognize DNR orders in out-of-hospital settings, EMS personnel have been obligated to perform full resuscitative measures when encountering a patient unable to convey directions regarding medical treatment.

While it is clear within the emergency medical services' community that a patient has the authority to determine his/her medical treatment, EMS personnel have been unable to consider a patient's wishes regarding resuscitation in the out-of-hospital setting where the patient is either not conscious or not competent, due to the difficulty of ascertaining the validity of these wishes in the field under emergency conditions. Usually there is no ongoing relationship between the emergency medical services personnel and the patient. Emergency conditions require an immediate response and accurate identification. Authentication of individuals and documents is difficult, if not impossible, under emergency field conditions.

This Comfort Care / DNR ("CC/DNR") Order Verification Protocol is designed to allow EMS personnel to honor a DNR order in an out-of-hospital setting. To date, there are no standardized documents by which EMS personnel can verify a DNR order in the field, under emergency conditions. This protocol provides for a state-wide, uniform DNR order verification, approved by the Department of Public Health (DPH), that EMS personnel can instantly recognize as an acceptable verification of an existing DNR order; thus, allowing EMS personnel to honor the patient's request for no resuscitation and to provide the patient with palliative care in conformance with the Comfort Care protocol.

### PURPOSE

The purpose of this protocol is to: (1) provide a verification/authentication of DNR orders to enable EMS personnel to honor DNR orders in out-of-hospital settings; (2) clarify the role and

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<sup>1</sup> Certain nurse practitioners and physician assistants can issue DNR orders. Since not all nurse practitioners and physician assistants are authorized to issue DNR orders, this protocol refers to authorized nurse practitioners or authorized physician assistants to distinguish that group, which is authorized to sign the Comfort Care/Do Not Resuscitate Order Verification. Only those nurse practitioners or physician assistants as defined below are authorized to sign the verification forms.

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responsibilities of EMS personnel at the scene and/or during transport of patients who have a current, valid CC/DNR Order Verification; (3) avoid resuscitation of patients who have a current, valid CC/DNR Order Verification; and (4) provide palliative/comfort care measures for patients with a current, valid CC/DNR Order Verification. This protocol is not intended to alter the standard of practice in issuing DNR orders in any way, but only to provide a standardized mechanism for the verification of the DNR order so that it may be recognized in out-of-hospital settings.

#### DEFINITIONS

For purposes of this protocol, the following are defined:

1. **Attending Physician:** A physician, licensed pursuant to M.G.L. c.112, §2, selected by or assigned to a patient, who is responsible for the treatment and care of the patient, in whatever setting medical diagnosis or treatment is rendered. Where more than one physician shares such responsibility, any such physician may act as the attending physician for purposes of this protocol.
2. **Authorized Nurse Practitioner ("Authorized NP"):** A registered nurse in the Commonwealth with advanced nursing knowledge and clinical skills as required by M.G.L. c. 112, §80B and 244 CMR 4.00 et seq. A nurse practitioner may write a DNR order, where this activity is agreed upon by the nurse practitioner and the collaborating physician in written practice guidelines (244 CMR 4.22[1]). It is the obligation of the nurse practitioner, the collaborating physician, and the institution where the nurse practitioner is practicing at the time the CC/DNR is issued to ensure that the nurse practitioner is authorized under his/her written practice guidelines to write a DNR order and by extension to sign the Comfort Care Verification form.
3. **Authorized Physician Assistant ("Authorized PA"):** A person who meets the requirements for registration set forth in M.G.L. c. 112, §9I, and who may provide medical services appropriate to his or her training, experience and skills under the supervision of a registered physician. The Division of Registration provides that a physician assistant may write DNR orders if: (1) his/her supervising physician determines that issuing a DNR order is within the competence of the physician assistant given the physician assistant's level of training and expertise (263 CMR 5.04 [1]), and (2) with regard to DNR orders, the physician assistant must consult with his/her supervising physician prior to issuance. A physician assistant may properly review and renew a preexisting DNR order without prior consultation with his/her supervising physician. Since the Comfort Care/Do Not Resuscitate Order Verification is a verification of an existing valid DNR order, the signing of the verification is comparable to the renewal of a preexisting DNR order. It is the obligation of the physician assistant, his/her supervising physician, and the institution where the physician assistant is practicing at the time the CC/DNR is issued to ensure

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that the physician assistant is authorized under his/her practice guidelines to write a DNR order and by extension to sign the Comfort Care Verification form.

4. Cardiopulmonary Resuscitation ("CPR"): Includes for purposes of this protocol, cardiac compression, artificial ventilation, oropharyngeal airway (OPA) insertion, advanced airway management such as endotracheal intubation, cardiac resuscitation drugs, defibrillation and related procedures.
5. Comfort Care / DNR Order Verification Bracelet ("bracelet"): A bracelet modeled after a hospital identification bracelet, which shall include the patient's name; date of birth; gender; date of expiration, if any, of the underlying DNR order; and the signature and telephone number of the attending physician, authorized nurse practitioner, or authorized physician assistant. The bracelet can only be issued to someone who has a valid CC/DNR Order Verification Form and must be issued by an attending physician, authorized nurse practitioner, or authorized physician assistant. Wearing the bracelet is voluntary; however, it is strongly recommended for individuals who remain mobile.
6. Comfort Care / DNR Order Verification Form ("form"): A standardized state-wide form for verification of DNR orders in the out-of-hospital setting, approved by the Department of Public Health. The CC/DNR Order Verification Form shall include the patient's name; date of birth; gender; address; date of issuance and date of expiration, if any, of the underlying DNR order; the signature and telephone number of an attending physician, authorized nurse practitioner, or authorized physician assistant; and the signature of the patient, guardian or health care agent. The CC/DNR Order Verification Form is the only DNR document that EMS personnel will be instructed to honor and can only be issued by an attending physician, authorized nurse practitioner, or authorized physician assistant.
7. Comfort Care / DNR Order Verification Protocol: A standardized state-wide patient care protocol to be followed by EMS personnel (EMTs and First Responders) when encountering a patient with a current, valid CC/DNR Order Verification Form and/or Bracelet. The protocol provides that the patient in respiratory or cardiac distress will receive palliative, comfort care consistent with the scope of the EMT's training and certification, but no resuscitative measures. The protocol applies to all emergency medical services personnel (Basic, Intermediate and Paramedic EMTs and First Responders) operating in an out-of-hospital setting and requires that they perform patient assessment and treatment in accordance with this protocol.
8. Emergency Medical Services Personnel: Any EMT certified pursuant to 105 CMR 170.000 et seq. and any First Responder as defined in 105 CMR 171.050.

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9. Guardian: An individual appointed by the court, pursuant to M.G.L. c. 201, §§ 6, 6A, or 6B, to make decisions for a person who is mentally ill, mentally retarded or unable to make or communicate informed decisions due to physical incapacity or illness, provided that the appointment as guardian includes the right to make health care decisions; or, a parent or other individual who is legally entitled to make decisions about the care and management of a child during his/her minority.
10. Health Care Agent: An individual authorized by a health care proxy to make health care decisions on behalf of the principal, pursuant to M.G.L. c. 201D. The authority of the health care agent becomes effective only upon a written determination of the attending physician, pursuant to M.G.L. c. 201D, § 6, that the principal lacks the capacity to make or to communicate health care decisions.
11. Life-sustaining procedure: Cardiopulmonary resuscitation, as defined in number 4 above. Life-sustaining procedures shall not include any medical procedure or intervention considered necessary by the attending physician, EMS personnel, or the medical control physician to provide comfort care or to alleviate pain.
12. Medical Control Physician: A physician designated within the EMS system to provide on-line and off-line medical direction to EMS personnel.
13. Palliative care: Comfort care that eases or relieves symptoms without correcting the underlying cause or disease.
14. Out-of-hospital: Any setting outside a hospital where EMS personnel may be called and may encounter patients with CC/DNR Order Verifications including, but not limited to, long-term care, hospice, assisted living, private homes, schools, inter-facility transport, and other public areas.

### AUTHORITY

It is well settled in Massachusetts that individuals, while competent, have the right to determine the course of their medical treatment, including the right to refuse medical treatment and to make end of life decisions. *Norwood Hospital v. Munoz*, 409 Mass. 116, 564 N.E.2d 1017 (1991); *Brophy v. New England Sinai Hospital*, 398 Mass. 417, 497 N.E.2d 626 (1986); *Lane v. Candura*, 6 Mass. App. Ct. 377, 376 N.E.2d 1232 (1978); and *Superintendent of Belchertown State School v. Saikewicz*, 373 Mass. 728, 370 N.E.2d 417 (1977). Similarly, it is recognized that incompetent individuals have the same right to determine the course of their medical treatment as well as to refuse medical treatment. *Brophy v. New England Sinai Hospital*, supra; *Saikewicz*, supra; *Matter of Spring*, 380 Mass. 629, 405

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N.E.2d 115 (1980). See also, *Matter of Dinnerstein*, 6 Mass. App. Ct. 466, 380 N.E.2d 134 (1978); and *Care and Protection of Beth*, 412 Mass. 188, 587 N.E.2d 1377 (1992).

As an extension of the health profession into the field, the emergency medical system has the same obligation to recognize an individual's right to refuse medical treatment in an out-of-hospital setting, where the authenticity of the documentation can be validated.

Further authority: M.G.L. c. 111C and 105 CMR 170.000 et seq.; M.G.L. c. 111 § 201 and 105 CMR 171.000 et seq.

### **IMPLEMENTATION PROCEDURES**

**ELIGIBILITY:** Anyone with a current valid DNR order is eligible for a CC/DNR Order Verification (Form and/or Bracelet), including minors.

A DNR order is an order, executed by a physician, authorized nurse practitioner, or authorized physician assistant, issued according to the current standard of care. The standard for issuing the DNR order is neither defined nor changed by this protocol. This protocol simply serves to verify, for EMS personnel, a DNR Order issued by a physician.

**VALIDITY:** To assure that a DNR order is recognized in any out-of-hospital setting, an attending physician, authorized nurse practitioner, or authorized physician assistant must provide a patient, who has a current DNR order, with a fully executed CC/DNR Order Verification. Pursuant to this protocol, EMS personnel will be instructed to honor a current valid CC/DNR Order Verification Form or CC/DNR Order Verification Bracelet. Patients without CC/DNR Order Verification Form or Bracelet will be resuscitated by EMS personnel in accordance with standard EMS protocols.

**CONTENT:** The CC/DNR Order Verification Form shall include:

- the name, date of birth, gender, and address of the patient;
- the name of the guardian or health care agent, if any;
- the signature of the patient or of the guardian or health care agent;
- verification by the attending physician, authorized nurse practitioner, or authorized physician assistant, of the existence of a current valid DNR order;
- the signature and telephone number of the attending physician, authorized nurse practitioner, or authorized physician assistant. If the signature is of an authorized nurse practitioner, or authorized physician assistant, the name (signature not required) of the collaborating or supervising physician shall also be included.;
- the issuance date and expiration date, if any, of the DNR order; and,
- authorization of EMS personnel to act pursuant to the Comfort Care protocol.



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The CC/DNR Order Verification Bracelet shall include:

- the name, date of birth, and gender of the patient;
- the expiration date of the DNR order, if any; and,
- the printed name, signature and telephone number of the attending physician, authorized nurse practitioner, or authorized physician assistant. If the signature is of an authorized nurse practitioner, or authorized physician assistant, the name (signature not required) of the collaborating or supervising physician shall also be included.

**EXPIRATION:** To the extent that the DNR order written by the physician has an expiration date, the CC/DNR Order Verification Form and CC/DNR Order Verification Bracelet, if issued, shall have an identical expiration date. This protocol does not prescribe an expiration date, but rather leaves the expiration date up to the physician, authorized nurse practitioner, or authorized physician assistant.

If the DNR order is revoked by the physician, authorized nurse practitioner, or authorized physician assistant, patient, guardian or authorized health care agent, the CC/DNR Order Verification Form and CC/DNR Order Verification Bracelet, if any, shall be similarly revoked.

**ACCESS:** This protocol is implemented solely through physicians. Only physicians can request and receive forms from the Department of Public Health; however a physician may distribute forms to an authorized nurse practitioner, or authorized physician assistant for whom the physician is a collaborating or supervising physician.

This protocol is activated when EMS personnel encounter a CC/DNR Order Verification Form or Bracelet. EMS personnel must:

- confirm the identity of the individual with the CC/DNR Order Verification Form or Bracelet; and,
- confirm that the CC/DNR Order Verification Form is an original and is current and valid<sup>2</sup>, or that the patient is wearing a current and valid CC/DNR Order Verification Bracelet.

If there is a CC/DNR Order Verification Form and/or a Bracelet, and either indicates a revocation or expiration of the CC/DNR Order Verification, EMS personnel shall resuscitate.

**PATIENT CARE:** Upon confirmation of a current, valid CC/DNR Order Verification Form or Bracelet, EMS personnel shall follow the following procedures:

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<sup>2</sup> It is not the responsibility of the EMT to confirm the validity of the signature of the physician, authorized nurse practitioner, or authorized physician assistant, nor is it the EMT's responsibility to determine whether the physician signing the verification is an attending physician, or the nurse practitioner, or physician assistant authorized to sign the verification. Provided that the form is the original, is intact and is fully executed, it shall be presumed valid by the EMT unless there is information presented to the contrary.

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- If the patient is not in respiratory or cardiac arrest and the patient's heart beat and breathing are adequate, but there is some other emergency illness or injury, the EMS personnel shall provide full treatment and transport, as appropriate, within the scope of their training and level of certification.
- If the patient is in full respiratory or cardiac arrest, the EMS personnel shall not resuscitate, which means:
  - ⇒ do not initiate CPR;
  - ⇒ do not insert an oropharyngeal airway (OPA);
  - ⇒ do not provide ventilatory assistance;
  - ⇒ do not artificially ventilate the patient (mouth-to-mouth, bag valve mask, positive pressure, etc.);
  - ⇒ do not administer chest compressions;
  - ⇒ do not initiate advanced airway measures such as endotracheal intubation;
  - ⇒ do not administer cardiac resuscitation drugs; and,
  - ⇒ do not defibrillate.
- If the patient is **not** in full respiratory or cardiac arrest, but the patient's heart beat or breathing is inadequate, EMS personnel shall not resuscitate but shall provide, within the scope of their training and level of certification, full palliative care and transport, as appropriate, including:
  - ⇒ emotional support;
  - ⇒ suction airway;
  - ⇒ **administer oxygen**;
  - ⇒ application of cardiac monitor;
  - ⇒ control bleeding;
  - ⇒ splint;
  - ⇒ position for comfort;
  - ⇒ initiate IV line; and,
  - ⇒ contact Medical Control, if appropriate, for further orders, including necessary medications.
- If EMS personnel have any question regarding the applicability of the CC/DNR Order Verification with regard to any specific individual, the EMS personnel shall:
  - verify with the patient, if the patient is able to respond;
  - provide full treatment; or,
  - contact Medical Control for further orders.
- If efforts are initiated prior to confirmation of the valid CC/DNR Order Verification, discontinue the following resuscitative measures upon verification:
  - ⇒ CPR;

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- ⇒ ventilatory assistance;
- ⇒ cardiac medications; and,
- ⇒ advanced airway measures.

**Established IV lines and advanced airways should remain in place.**

**DOCUMENTATION:** When a CC/DNR Order Verification Form and/or Bracelet is encountered by EMS personnel, it shall be documented. EMS personnel must also document palliative care provided to the patient and that the CC/DNR Order Verification Form or Bracelet is current and valid. Ambulance service personnel must document the presence of the CC/DNR Order Verification on the ambulance trip record.

**REVOCATION:** EMS personnel are not to honor any DNR request where the CC/DNR Order Verification Form or Bracelet, if present, is void or not intact. If there is a CC/DNR Order Verification Form and Bracelet, and either indicates a revocation, EMS personnel shall resuscitate.

- The CC/DNR Order Verification may be revoked by the patient at any time, regardless of mental or physical condition, by the destruction or affirmative revocation of the CC/DNR Order Verification, or by his or her direction that the CC/DNR Order
- Verification not be followed by out-of-hospital providers or be destroyed. Patients shall be instructed, upon revocation, to destroy the CC/DNR Order Verification Form, CC/DNR Order Verification Bracelet, if issued, and the underlying DNR order.
- If an individual identifying him/herself as the health care agent or guardian revokes the CC/DNR Order Verification, EMS personnel shall resuscitate, as this raises an issue of doubt as to the validity of the CC/DNR Order Verification.
- EMS personnel, upon witnessing or verifying a revocation, shall communicate that revocation in writing to the hospital to insure its inclusion in the patient's medical record. Ambulance service personnel shall document the revocation on the ambulance trip record.
- **In any situation where EMS personnel have a good faith basis to doubt the continued validity of the CC/DNR Order Verification, EMS personnel shall resuscitate.**

Date: April 9, 1999

## APPENDIX C: CESSATION OF RESUSCITATION (Effective 2/1/05)

**PURPOSE:** 1) TO CLARIFY FOR EMS SERVICES AND THEIR EMTS WHEN RESUSCITATIVE MEASURES MAY BE WITHHELD FOR PATIENTS IN CARDIAC ARREST AND 2) TO DEFINE WHEN EMTS CAN CEASE RESUSCITATIVE MEASURES ALREADY INITIATED.

### **Background and EMS Services' Training/Support Services Obligations:**

Emergency Medical Technicians must begin or continue resuscitative measures for all patients in cardiac arrest except as indicated in this Protocol (also issued as Administrative Requirement (A/R) 5-515). If in doubt, begin resuscitative efforts.

All EMS services must provide appropriate training on management of death in the field, including legal, procedural, and psychological aspects; and access to support services.

EMS services and EMS personnel should be aware that the nursing staff of a health care facility, such as a skilled nursing facility, may need a physician order (including a medical control physician's order, if allowed by nursing home policy) to halt resuscitation attempts, even in the case of patients meeting EMS "obvious death" criteria, as set out below. Nursing staff and EMS personnel should come to a cooperative decision on continuation or termination of resuscitation; this process may include obtaining physician input and orders. If the medical professionals at the bedside are unable to reach agreement on attempting or terminating efforts, the presumption should be to continue resuscitative efforts and transport the patient to an emergency department.

### **I. EXCEPTIONS TO INITIATION OF RESUSCITATION**

Other than in overriding circumstances such as a large mass-casualty incident or a hazardous scene, the following are the **only** exceptions to initiating and maintaining resuscitative measures in the field:

1. Current, valid DNR, verified per the Comfort Care Protocol.
2. Trauma inconsistent with survival
  - a. Decapitation: severing of the vital structures of the head from the remainder of the patient's body
  - b. Transection of the torso: body is completely cut across below the shoulders and above the hips
  - c. Evident complete destruction of brain or heart
  - d. Incineration of the body
  - e. Cardiac arrest (i.e. pulselessness) documented at first EMS evaluation when such condition is the result of significant blunt or penetrating trauma and the arrest is obviously and unequivocally due to such trauma, EXCEPT in the specific case of arrest due to penetrating chest trauma and short transport time to definitive care (in which circumstance, resuscitate and transport)

## APPENDIX C: CESSATION OF RESUSCITATION (con't)

3. Body condition clearly indicating biological death.
  - a. Complete decomposition or putrefaction: the skin surface (**not** only in isolated areas) is bloated or ruptured, with sloughing of soft tissue, and the odor of decaying flesh.
  - b. Dependent lividity and/or rigor: when the patient's body is appropriately examined, there is a clear demarcation of pooled blood within the body, and/or major joints (jaw, shoulders, elbows, hips, or knees) are immovable.

Procedure for lividity and/or rigor: All of the criteria below must be established and documented in addition to lividity and/or rigor in order to withhold resuscitation:

- i. Respirations are absent for at least 30 seconds; **and**
- ii. Carotid pulse is absent for at least 30 seconds; **and**
- iii. Lung sounds auscultated by stethoscope bilaterally are absent for at least 30 seconds; **and**
- iv. Both pupils, if assessable, are non-reactive to light.

### **II. Cessation of Resuscitation by EMTs**

Emergency Medical Technicians must continue resuscitative measures for all patients in cardiac arrest unless contraindicated by one of the exceptions below.

1. EMTs, certified at the Basic, Intermediate and Paramedic levels, may cease resuscitative efforts at any time when any "Exception to Initiation of Resuscitation" as defined in I., above, is determined to be present.
2. EMTs certified at the **Paramedic level only** may cease resuscitative efforts in an adult patient 18 years of age or older, regardless of who initiated the resuscitative efforts, without finding "obvious death" criteria **only** by the following procedure, and **only** if the EMS system's Affiliate Hospital Medical Director has approved of use of this procedure, as follows:
  - a. There is no evidence of or suspicion of hypothermia; **AND**
  - b. Indicated standard Advanced Life Support measures have been successfully undertaken (including for example effective airway support, intravenous access, medications, transcutaneous pacing, and rhythm monitoring); **AND**
  - c. The patient is in asystole or pulseless electrical activity (PEA), and REMAINS SO persistently, unresponsive to resuscitative efforts, for at least twenty (20) minutes while resuscitative efforts continue; **AND**
  - d. No reversible cause of arrest is evident; **AND**
  - e. The patient is not visibly pregnant; **AND**
  - f. An on-line medical control physician gives an order to terminate resuscitative efforts.

## **APPENDIX C: CESSATION OF RESUSCITATION (con't)**

### **III. Special Considerations and Procedures:**

1. In all cases where a decedent is left in the field, procedures must include notification of appropriate medical or medico-legal authorities.
2. EMS documentation must reflect the criteria used to determine obvious death or allow cessation of resuscitative efforts.

## APPENDIX D: RESCUE AIRWAY PROTOCOLS (ADULT & PEDIATRIC)

### RESCUE AIRWAY PROTOCOL ~ ADULT

The Rescue Airway Protocol (RAP) may be used in conjunction with any other protocol requiring airway control by those authorized to perform endotracheal intubation. When confronted with an airway that is evaluated as **unstable\*** (e.g., ***unsuccessful intubation after a total of 3 attempts, unable to clear a foreign body airway obstruction, airway grading\*\* suggests intubation unlikely***), advanced providers should utilize alternate equipment and training to gain control of the airway. Additionally, if the Emergency Medical Technician is unable to ventilate the patient, a determination should be made as to whether this inability is due to a manageable cause (e.g., *poor technique, equipment failure, mask size, mask seal*) and corrective measures applied, when applicable.

**\*\*Grade: Assessment of patient's airway to determine if there is expected difficulties with regard to intubation. i.e. anatomical alignment of the airway for ventilation."**

### ASSESSMENT / TREATMENT PRIORITIES

1. Determine if the patient's airway is unstable\*.
2. Ensure scene safety and maintain appropriate body substance isolation precautions.
3. Maintaining grading\*\* of the patient's airway.
4. Continue Bag-Valve-Mask (BVM) management with supplemental oxygen with oropharyngeal or nasopharyngeal adjuncts, (OPA or NPA) in place.
5. Initiate transport as soon as possible
6. Follow AHA & ARC guideline for management of the adult FBAO.

### TREATMENT

#### INTERMEDIATE PROCEDURES

##### STANDING ORDERS

1. Arrange for Advanced Life Support (ALS) for intercept
2. After completing your assessment as listed above:
  - a. Provide Rescue Airway Management.
  - b. If BVM failure is the result of a manageable cause.
    - Apply countermeasures if applicable
  - c. If the airway is unstable and the adult patient can be ventilated.
    - Insert the Laryngeal Mask Airway (LMA) or Combi-Tube
  - d. Initiate IV Normal Saline while in transport.
  - e. Notify receiving hospital.

## APPENDIX D RESCUE AIRWAY PROTOCOL ~ ADULT (con't)

### PARAMEDIC PROCEDURES

#### STANDING ORDERS

1. After completing your assessment as listed above:
  - a. Provide Rescue Airway Management.
  - b. If BVM failure is the result of a manageable cause.
    - Apply countermeasures if applicable
  - c. If the airway is unstable and the adult patient can be ventilated.
    - Insert the Laryngeal Mask Airway (LMA) or Combi-Tube
  - d. If the airway is unstable and the patient cannot be ventilated **perform a needle cricothyrotomy and provide oxygen via jet ventilation.**
  - e. **Contact Medical Control for further orders:**
  - f. Initiate IV Normal Saline while in transport.
  - g. Notify receiving hospital.

The Rescue Airway Protocol (RAP) may be used in conjunction with any other protocol requiring airway control by those authorized to perform endotracheal intubation. When confronted with an airway that is evaluated as **unstable\*** (e.g., ***unsuccessful intubation after a total of 3 attempts, unable to clear a foreign body airway obstruction, airway grading\*\* suggests intubation unlikely***), advanced providers should utilize alternate equipment and training to gain control of the airway. Additionally, if the Emergency Medical Technician is unable to ventilate the patient, a determination should be made as to whether this inability is due to a manageable cause (e.g., *poor technique, equipment failure, mask size, mask seal*) and corrective measures applied, when applicable.

**\*\*Grade: Assessment of patient's airway to determine if there is expected difficulties with regard to intubation. i.e. anatomical alignment of the airway for ventilation."**

### ASSESSMENT / TREATMENT PRIORITIES

1. Determine if the patient's airway is unstable\*.
2. Ensure scene safety and maintain appropriate body substance isolation precautions.
3. Maintaining grading\*\* of the patient's airway.
4. Continue Bag-Valve-Mask (BVM) management with supplemental oxygen with oropharyngeal or nasopharyngeal adjuncts, (OPA or NPA) in place.
5. Initiate transport as soon as possible
6. Follow AHA & ARC guideline for management of the adult FBAO.



## APPENDIX D RESCUE AIRWAY PROTOCOL ~ ADULT (con't)

### TREATMENT

#### INTERMEDIATE PROCEDURES

##### STANDING ORDERS

1. Arrange for Advanced Life Support (ALS) for intercept
2. After completing your assessment as listed above:
  - a. Provide Rescue Airway Management.
  - b. If BVM failure is the result of a manageable cause.
    - Apply countermeasures if applicable
  - c. If the airway is unstable and the adult patient can be ventilated.
    - Insert the Laryngeal Mask Airway (LMA) or Combi-Tube
  - d. Initiate IV Normal Saline while in transport.
  - e. Notify receiving hospital.

#### PARAMEDIC PROCEDURES

##### STANDING ORDERS

1. After completing your assessment as listed above:
  - a. Provide Rescue Airway Management.
  - b. If BVM failure is the result of a manageable cause.
    - Apply countermeasures if applicable
  - c. If the airway is unstable and the adult patient can be ventilated.
    - Insert the Laryngeal Mask Airway (LMA) or Combi-Tube
  - d. If the airway is unstable and the patient cannot be ventilated **perform a needle cricothyrotomy and provide oxygen via jet ventilation.**
  - e. **Contact Medical Control for further orders:**
  - f. Initiate IV Normal Saline while in transport.
  - g. Notify receiving hospital.

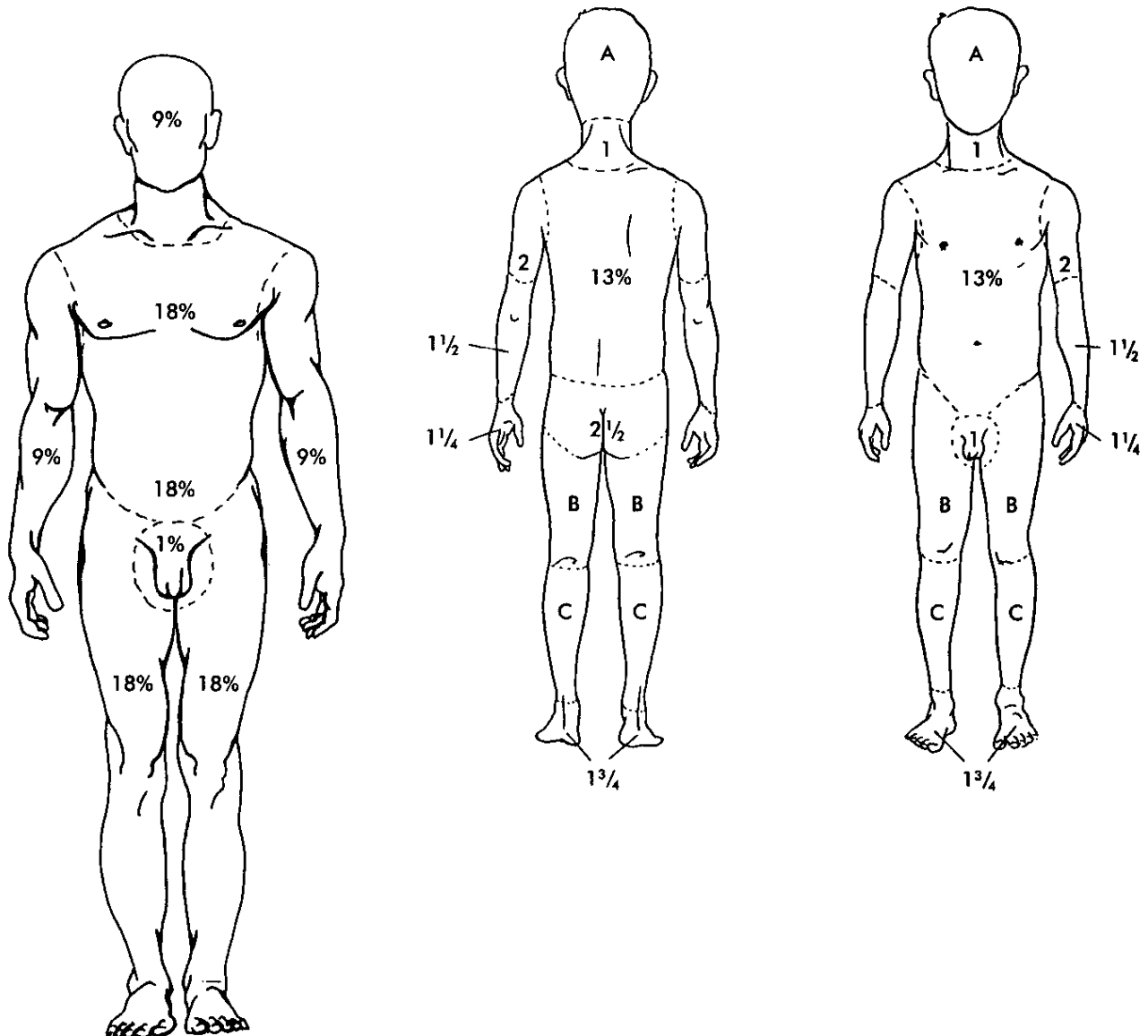
## APPENDIX E - ENDOTRACHEAL TUBE SIZES

Suggested Sizes for Endotracheal (ET) Tubes:

<b>Age</b>	<b>Internal Diameter of Tube in mm</b>
Newborn	3.0
6 Months	3.5
18 Months	4.0
3 Years	4.5
5 Years	5.0
6 Years	5.5
8 Years	6.0
12 Years	6.5
16 Years	7.0

## APPENDIX F - BURN CHART (ADULT & PEDIATRIC)

**Lund & Browder Chart**



**Estimation of Burn Size (Children)**

Area	Age 0	1 yr.	5 yr.	10 yr.	15 yr.
A - 1/2 of head	9 1/2 %	8 1/2 %	6 1/2 %	5 1/2 %	4 1/2 %
B - 1/2 of one thigh	2 3/4 %	3 1/4 %	4 %	4 1/4 %	4 1/2 %
C - 1/2 of one leg	2 1/2 %	2 1/2 %	2 3/4 %	3 %	3 1/4 %

## APPENDIX G - TRAUMA SCORES

GLASGOW COMA SCORE	
<b>Eye Opening:</b>	
Spontaneous	4
To Voice	3
To Pain	2
None	1
<b>Verbal Response:</b>	
Oriented	5
Confused	4
Inappropriate Words	3
Incomprehensible Words	2
None	1
<b>Motor Response:</b>	
Obeys Command	6
Localizes Pain	5
Withdrawn (Pain)	4
Flexion (Pain)	3
Extension (Pain)	2
None	1
<b>Total GCS Score:</b>	3 - 15

Total GCS Points	
14 - 15	5
11 - 13	4
8 - 10	3
5 - 7	2
3 - 4	1

GCS	Revised Trauma Score		Coded Values
	SBP	RR	
13 - 15	>89	10 - 29	4
9 - 12	76 - 89	>29	3
6 - 8	50 - 75	6 - 9	2
4 - 5	1 - 49	1 - 5	1
3	0	0	0

SBP = Systolic Blood Pressure, RR = Respiratory Rate

**APPENDIX G - TRAUMA SCORES****CALCULATION OF TRAUMA SCORE USING THE GLASGOW COMA SCALE****Glasgow Coma Scale**

Eye Opening Response:	Spontaneous	4
	To Voice	3
	To Pain	2
	None	1
Best Verbal Response:	Oriented	5
	Confused	4
	Inappropriate Words	3
	Incomprehensible Sounds	2
	None	1
Best Motor Response:	Obey Command	6
	Localizes Pain	5
	Withdraws (Pain)	4
	Flexion (Pain)	3
	Extension (Pain)	2
	None	1

Total: Apply this score to GCS portion of TS Below: 3 - 15

**Trauma Score**

GCS: (total points from above)	14 - 15	5
	11 - 13	4
	8 - 10	3
	5 - 7	2
	3 - 4	1
Respiratory Rate:	10 - 24 / Min.	4
	25 - 35 / Min.	3
	36 Min. or greater	2
	1 - 9 / Min.	1
	None	0
Respiratory Expansion:	Normal	1
	Retractive / None	0
Systolic Blood Pressure:	90 mm Hg or greater	4
	70 - 89 mm Hg	3
	50 - 69 mm Hg	2
	0 - 49 mm Hg	1
	No Pulse	0
Capillary Refill:	Normal	2
	Delayed	1
	None	0

Total Trauma Score: 1 - 16

Trauma Score 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

## APPENDIX G - TRAUMA SCORES

### COMPONENTS OF THE PEDIATRIC TRAUMA SCORE

Component	Values		
	+2	+1	-1
Size	≥ 20 kg	10 - 20 kg	≤ 10 kg
Airway	Normal	Maintainable	Unmaintainable
CNS	Awake	Obtunded	Coma
SBP	≥ 90 mm Hg	50 - 90 mm Hg	≤ 50 mm Hg
Open Wound	None	Minor	Major
Skeletal Injuries	None	Closed Fracture	Open or Multiple Fractures

CNS: Central Nervous System, SBP: Systolic Blood Pressure

## **APPENDIX H – REQUIRED SKILL**

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## **APPENDIX I– PROCEDURES**

**The following conditions must be met in order for your service to provide the following treatment as listed below:**

1. **Your Medical Director Must Have Authorized You As An EMT To Utilize This Portion Of The Protocol Based On Your Level Of Certification.**
2. **You Ambulance Service Must Have A Current Signed MOA With The Hospitals Served.**
3. **The Minimum Standard Training Component must be achieved as outlined by OEMS.**



## **APPENDIX I– PROCEDURES**

**BLS:**     **a. Albuterol Administration via Nebulizer (Service Option)**

**ALS:**     **a. Needle Cricothyroidotomy**

- 4.    The approved training program can be obtained from the OEMS website at:**

**<http://www.state.ma.us/dph/oems/emttrain.htm>**

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## **APPENDIX I– PROCEDURES**

### **ALS: A. Needle Cricothyrotomy (Approved for Paramedics Only)**

The following is a general description of one of several accepted techniques being used throughout the Commonwealth, and may be used as a guideline. Due to differences in medical devices used by individual systems, the procedure may vary slightly. Refer to your local and regional guidelines for the technique and equipment used in your system.

Note: Appropriate body substance isolation precautions are required whenever caring for the trauma patient.

**Indications:** The indications for performing a needle Cricothyrotomy on a patient will be:

1. The patient is in imminent danger of death.
2. No alternative airway device/maneuver has been successful.
3. The patient cannot be oxygenated or ventilated by any other means

The local EMS Medical Director has appropriately trained and authorized the treating EMT-Paramedics.

**Examples of types of patients potentially meeting the above criteria include (but are not limited to):**

1. Patients suffering traumatic arrest
2. Patients suffering multiple traumatic injuries
3. Patients suffering an upper airway obstruction

Recognizing the time critical nature of the emergency, Needle Cricothyrotomy will be a Standing Order for patients/systems/paramedics meeting all of the above criteria. (See Also Rescue Airway Protocol Appendix)

- A. Assemble and prepare oxygen tubing by cutting a hole toward one end of the tubing. Connect the other end of the oxygen tubing to an oxygen source, capable of delivering 50 psi or greater at the nipple, and assure free flow of oxygen through the tubing.
- B. Place the patient in a sitting position.
- C. Assemble a #12- or 14-gauge, 8.5 cm, over-the-needle catheter to a 6- to 12-mL syringe.
- D. Clean the neck with an aseptic technique, using antiseptic swabs.
- E. Palpate the cricothyroid membrane, anteriorly, between the thyroid cartilage and cricoid cartilage. Stabilize the trachea with the thumb and forefinger of one hand to prevent lateral movement of the trachea during the procedure.
- F. Puncture the skin midline with the needle attached to a syringe, directly over the cricothyroid membrane (i.e., mid-sagittal).
- G. Direct the needle at a 45 degree angle caudally, while applying negative pressure to the syringe.
- H. Carefully insert the needle through the lower half of the cricothyroid membrane, aspirating as the needle is advanced.
- I. Aspiration of air signifies entry into the tracheal lumen,
- J. Remove the syringe and withdraw the stylet while gently advancing the catheter downward into position, being careful not to perforate the posterior wall of the trachea,

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## **Needle Cricothyrotomy (con't)**

- K. Attach the oxygen tubing over the catheter needle hub (you may use a 4.0 ET tube connector), and secure the catheter to the patient's neck.
- L. Intermittent ventilation can be achieved by occluding the open hole cut into the oxygen tubing with your thumb for one second and releasing it for four seconds. After releasing your thumb from the hole in the tubing, passive exhalation occurs. Note: Adequate PaO<sub>2</sub>, can be maintained for only 30 to 45 minutes.
- M. Continue to observe lung inflations and auscultate the chest for adequate ventilation.

## **Complications of Needle Cricothyrotomy**

- 1. Asphyxia
- 2. Aspiration
- 3. Cellulitis
- 4. Esophageal perforation
- 5. Exsanguinating hematoma
- 6. Hematoma
- 7. Posterior tracheal wall perforation
- 8. Subcutaneous and/or mediastinal emphysema
- 9. Thyroid perforation
- 10. Inadequate ventilations leading to hypoxia and death

## **APPENDIX J - AIR MEDICAL TRANSPORT PROTOCOLS**

### **Statewide Trauma Triage Guidelines for Air Medical Services September, 1997**

#### **Introduction:**

The use of air medical services has become the standard of care for many critically ill or injured patients who require transport to specialized medical facilities such as Trauma Centers.

The purpose of these Guidelines is to establish a clinical framework for prehospital EMS personnel upon which to make decisions regarding when to access air medical support services. The following constitute the philosophical foundation for these Guidelines.

- EMS personnel should consider requesting ground advanced life support (ALS) and air medical support when operational conditions listed below exist and the following patient conditions are present;
- Patients with an uncontrolled or compromised airway should be brought to the nearest appropriate facility unless advanced life support (ALS) service (by ground or air) can intercept in a more timely fashion; and:
- Patients in cardiac arrest subsequent to blunt trauma should be taken to the nearest facility.

These guidelines have been established so that air medical support does not require prior Medical Control approval. However, Medical Control contact should be considered whenever appropriate for patient management issues.

#### **OPERATIONAL CONDITIONS:**

1. When a patient meets patient criteria defined below and scene arrival time to estimated arrival time at the nearest appropriate hospital, including extrication time, exceeds 20 minutes:
2. Patient location, weather or road conditions preclude the use of standard ground ambulance; or
3. Multiple casualties / patients are present which will exceed the capabilities of local hospital and agencies.

## **APPENDIX J - AIR MEDICAL TRANSPORT PROTOCOLS (Con't)**

### **PATIENT CONDITIONS:**

#### **1. Physiologic Criteria:**

- a. Unstable Vital Signs
  - Blood Pressure less than 90.
  - Respiratory Rate greater than 30 or less than 10.

#### **2. Anatomic Injury:**

- a. Evidence of Spinal Cord injury including paralysis or paresthesia.
- b. Severe Blunt Trauma:
  - head injury (Glasgow Coma Scale of twelve [12] or less)
  - severe chest or abdominal injury.
  - severe pelvic injury excluding simple hip fractures.
- c. Burns:
  - greater than 20% Body Surface Area (BSA) second or third degree burns;
  - evidence of airway or facial burns;
  - circumferential extremity burns; or
  - burns associated with trauma.
- d. Penetrating injuries of head, neck, chest, abdomen or groin.
- e. Amputations of extremities, excluding digits.

**Special Conditions:** The following should be considered in deciding whether to request air medical transport, but are **not** automatic or absolute criteria:

#### **1. Mechanism of Injury**

- a. -Motor Vehicle Crash:
  - patient ejected from vehicle.
  - death in same passenger compartment.
- b. Pedestrian struck by a vehicle and thrown more than 15 feet, or run over by a vehicle.

#### **2. Significant Medical History**

- a. -Age greater than 55 or less than 10.
- b. -Significant coexistent illness.
- c. -Pregnancy.

## APPENDIX K - PROCESS FOR CHANGES TO THE STATEWIDE TREATMENT PROTOCOLS

All changes (any addition, deletion, or any other type of amendment) to the Massachusetts Statewide Pre-Hospital Treatment Protocols, including the ALS Interfacility Transfer Guidelines (Appendix N: A/R 5-509)<sup>1</sup>, require statewide dissemination and often require training of EMTs and Medical Control physicians prior to implementation. Therefore, to ensure a thorough review and orderly implementation, all protocol changes shall be approved and implemented on an annual basis, with the exception of those arising out of procedures described in Part B below.

Any protocol change must be approved pursuant to the following Procedures.

### PART A Procedures for Annual Protocol Changes

1. All requests for protocol changes shall be submitted by at least one Regional Medical Director to the Medical Services Committee on or before March 1, each year. The request for a protocol change shall include the following:
  - a. A detailed description of the proposed change;
  - b. A formal written endorsement from the Region(s) of origin for the proposed change;
  - c. The results of a literature search documenting the risk/benefit of the proposed change in the pre-hospital arena. A literature search related to proposed changes in the interfacility transfer guidelines shall document the validity and accepted use of the proposed change in acute care facilities as well as in interfacility transport. All literature identified, both pro and con, shall be included, accompanied by a summary of the literature;
  - d. Training standards for the proposed change, if appropriate.
  - e. **Submit 1 written and 1 electronic version of changes to protocols in PC format.**
2. The Medical Services Committee shall review and make a recommendation regarding each proposed change to the protocols. Requests for protocol changes may be submitted to and reviewed by the Medical Services Committee throughout the year on a rolling basis; however, proposed changes shall only be submitted as a complete package for EMCAB Executive Committee review and approval after the March 1 submission deadline. Where training is required for implementation of the protocol change, the Medical Services Committee shall timely distribute the approved protocol changes to the Training Committee for its approval of the training component.

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<sup>1</sup> Hereinafter the Massachusetts Statewide Pre-Hospital Treatment Protocols and the Interfacility Transfer Guidelines shall be referred to collectively as protocols.

## **APPENDIX K - PROCESS FOR CHANGES TO THE STATEWIDE TREATMENT PROTOCOLS (CON'T)**

3. All protocol changes approved by the Medical Services Committee, with Training Committee approval of training if appropriate, shall be forwarded to the Executive Committee by March 15 of each year. The EMCAB Executive Committee shall review the proposed protocol changes and make a final determination at its April committee meeting.
4. A presentation of the approved changes shall be made at the first meeting of the full EMCAB following the April Executive Committee approval.
5. OEMS shall timely notify all providers of approved protocol changes and any requirements regarding implementation (i.e. training and implementation date).

### **PART B**

#### **Procedures for Protocol Changes Allowable Other Than on an Annual Basis**

1. The State Medical Director shall have the discretion to implement immediate protocol changes when such emergency action is deemed by the Department to be necessary for the protection of public health and safety.
  - a. The State Medical Director shall base such emergency action on a thorough review of relevant literature, any applicable national and/or state standard(s) and, when feasible, consultation with EMS Regional Councils, the Medical Services Committee and/or the EMCAB Executive Committee.
  - b. When feasible, the State Medical Director shall convene an emergency meeting of the Medical Services Committee. The Medical Services Committee shall recommend any change to the protocols, and refer its recommendation and all supporting documents relating to the proposed change to the EMCAB Executive Committee for action. The EMCAB Executive Committee shall review the recommendation and make a final determination.
  - c. OEMS shall, in its discretion, establish reasonable time frames for said implementation, particularly if a change requires training, and shall timely disseminate such a protocol change and any relevant implementation requirements.



## **APPENDIX K - PROCESS FOR CHANGES TO THE STATEWIDE TREATMENT PROTOCOLS (CON'T)**

2. OEMS shall have the discretion to make changes to bring the protocols into compliance with national standards of care.
  - a. This shall be done, when feasible, in consultation with Regional EMS Councils, the Medical Services Committee, and/or EMCAB Executive Committee.
  - b. OEMS shall, in its discretion, establish reasonable time frames for said implementation, particularly if a change requires training, and shall timely disseminate such a protocol change and any relevant implementation requirements.

## APPENDIX L - MULTIPLE CASUALTY INCIDENTS (MCI) TRIAGE

**Each MCI/Disaster scene presents its own unique hazards and difficulties. This plan is a general guide to the management of MCIs. It should be understood that modifications may need to be made by command personnel on scene as such changes are needed.**

A multiple casualty incident (MCI) is any situation where the number of sick or injured patients exceeds the available local, regional or state EMS system resources to provide adequate care in a timely manner to minimize injury and death. An MCI may be the result of a man made disaster or a natural event. Successful management of an MCI will require preplanning and organization of local, regional and state EMS, fire, law enforcement and civil defense resources. Hospital resources and specialized care services must also be included in preparing your MCI plan.

MCI management process is defined in the Incident Command System (ICS). In general, the Fire Department establishes the overall command and designates the incident commander (IC). **NOTE:** Other agencies may function as the IC, for example, Law Enforcement agencies at a crime scene or hostage situation. Other agencies may assist the IC. Clear precise inter-agency communication networks must be established for successful MCI management.

Levels of response to an MCI can be developed and will dictate which personnel and resources will be required at the scene. These levels include:

**Level I Response:** A localized MCI that can be managed by local EMS and Rescue personnel without the need for mutual aid from outside organizations.

**Level II Response:** An MCI that overwhelms or severely taxes local EMS and Rescue personnel that requires the need for mutual aid and interagency coordination. Typically a large number of patients are involved.

**Level III Response:** An MCI that overwhelms both local and regional EMS and rescue resources. Multiple patients spread over multiple sites are often involved. Significant inter-agency coordination is required.

### TRIAGE

Triage is a special process of sorting patients by the severity of injury or illness to determine the need of emergency care and transportation. This needs to be a continuous process throughout the management of an MCI. The initial triage process should be performed by the first crew to arrive on scene and needs to be continuously reevaluated since the patient's triage status may change. Presently there are no national standard guidelines established for triage. Therefore, a suggested method of triage may be performed by either the METTAG (triage tagging system) or the START Field Guide (Simple Triage And Rapid Transportation) triage systems.

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**APPENDIX L - MULTIPLE CASUALTY INCIDENTS / TRIAGE (con't)**

A suggested approach to treatment prioritization of victims is that found in the **METTAG** system. The treatment priorities are defined as:

Zero priority (BLACK): and	Deceased or live patients with obvious fatal  non-resuscitatable injuries
First priority (RED): care and	Severely injured patients requiring immediate  transport. (e.g., respiratory distress, thoracoabdominal injury, severe head or maxillofacial injuries, shock/severe bleeding, severe burns)
Second priority (YELLOW): to be	Patients with injuries that are determined not  immediately life threatening. (e.g., abdominal injury without shock, thoracic injury without respiratory compromise, major fractures without shock, head injury/cervical spine injury, and minor burns)
Third priority (GREEN): immediate	Patients with minor injuries that do not require  stabilization. (e.g., soft tissue injuries, extremity fractures and dislocations, maxillofacial injuries without airway compromise and psychological emergencies)

The **START Field Guide** consists of a sixty (60) second patient assessment that evaluates ventilation, perfusion, and mental status to classify the victims as needing immediate or delayed transport or are non-salvageable or dead. This allows rescuers to quickly identify victims that are at greatest risk of early death or if they may require delayed transport. The METTAG or similar color coded tagging systems may be used as part of the START Field Guide.

**SCENE ASSESSMENT AND TRIAGE PRIORITIES**

1. Maintain universal blood and body fluid precautions.
2. The initial response team should assess the scene for potential hazards, safety and number of victims to determine the appropriate level of response.
3. Notify central dispatch to declare an MCI and need for interagency support as defined by incident level.

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**APPENDIX L - MULTIPLE CASUALTY INCIDENTS / TRIAGE (con't)****SCENE ASSESSMENT AND TRIAGE PRIORITIES (cont.)**

4. Identify and designate the following positions as qualified personnel become available:
  - Incident Command Officer
  - Communications Officer
  - Extrication / Hazards Officer
  - Primary Triage Officer
  - Secondary Triage Officer
  - Treatment Officer
  - Loading/Transportation Officer
5. Identify and designate sector areas of MCI
  - Incident Command/Communication Sector
  - Support Sector (supplies and resources)
  - Staging Sector
  - Extrication / Hazards Sector
  - Triage Sector
    - Primary Treatment Sector
    - Secondary Treatment Sector
    - Transportation Sector
6. Post incident MCI Plan
  - Critical Incident Stress Debriefing (CISD)
  - Post incident Critique

**BASIC, INTERMEDIATE AND PARAMEDIC MCI PROCEDURE SUMMARY**

All EMT level personnel will eventually be involved in the management of an MCI. It is imperative that all EMTs implement the above incident command system (ICS) in all MCI situations. Every EMT must be aware and have a thorough knowledge of their particular role and responsibilities in the rescue effort.

Due to the many complexities of MCI/Disaster situations, it is recommended that all EMTs should participate and receive additional training in MCI/Disaster management.

## APPENDIX M - PEDIATRIC VITAL SIGNS CHART

### PEDIATRIC EMERGENCY REFERENCE

Age Years	Weight Kg	Resp Rate	Heart Rate	Systolic Blood Pressur e	Resus. Mask	Self Inflating Bag	Laryngo- scope Blade	ET Tube Size mm	ET Tube Lip Line cm	Suction Cath. Fr.	Naso/Oro Gastric Tube	BP Cuff cm
Newborn	3 - 5	30- 60	100 - 160	60-80	Infant 0-1	Pediatric	O Miller	3.0	9.0	6	8	5
6 mos.	7	25- 40	90- 120	80-100	1	Pediatric	1 Miller	3.5	10.5	8	8	5
1 yr.	10	20- 30	90- 120	80-100	1-2	Pediatric	1 Miller	3.5	10.5	8	8	5
18 mos.	12	20- 30	80- 120	80-110	2	Pediatric	1 Miller	4.0	11.5	10	8	5
3 yrs.	15	20- 30	80- 120	80-110	3	Pediatric	2 Miller	4.5	14.0	10	10	5
5 yrs.	20	18- 24	70- 110	80-110	3	Pediatric	2 Miller	5.0	15.0	10	10	7
6 yrs.	20	18- 24	80- 100	80-110	3	Pediatric	2 Miller	5.5	16.5	10	10	7
8 yrs.	25	18- 24	70- 110	80-110	3	Adult	2 Miller	6.0	18.0	14	10	9.5
10 yrs.	30	16- 20	70- 110	90-120	3	Adult	2 Miller	6.0	18.0	14	12	9.5
12 yrs.	40	16- 20	60- 110	90-120	4	Adult	2 Miller 2 Mac	6.5	19.5	14	12	9.5
14 yrs.	50	16- 20	60- 105	90-120	4-5	Adult	3 Miller 3 Mac	7.0	21.0	14	14	Adult
16 yrs.	60	16- 20	60-80	80-120	4-5	Adult	3 Miller 3 Mac	7.5	21.5	14	14	Adult
18 yrs.	70	16- 20	60-80	80-120	5	Adult	3 Miller 3 Mac	7.5	21.5	16	16	Adult

## APPENDIX M - PEDIATRIC VITAL SIGNS CHART

### PEDIATRIC EMERGENCY REFERENCE

#### PEDIATRIC TRAUMA SCORE

Component	+2	+1	-1
Size	>20kg	10-20kg	<10kg
Airway	Normal	Maintable	Unmaintable
CNS	Awake	Obtunded	Comatose
Systolic BP	>90 mmHg	90-60 mmHg	<50 mmHg
Open Wound	None	Minor	Major/Penetrating
Skeletal	None	Closed	Open/Multiple Fx

\* Pediatric Trauma Center if PTS is 8 or less.

#### AIRWAY MANAGEMENT

ABCs, 100% Oxygen  
 Bag-Valve-Mask  
 Suction with rigid catheter  
 Oropharyngeal airway  
 Laryngoscope with blade  
 Endotracheal tube/Stylet  
 SaO<sub>2</sub>  
 End-tidal CO<sub>2</sub>

#### LEVEL OF RESPONSE

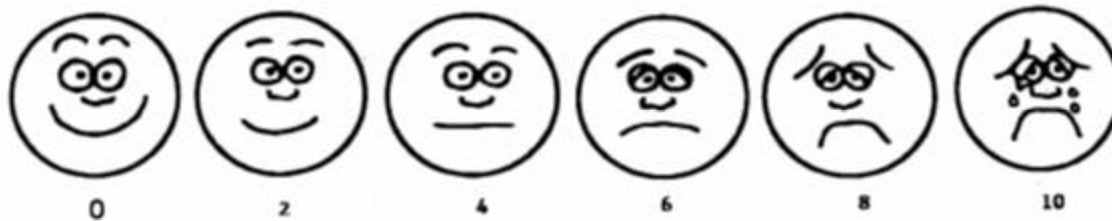
A =Alert  
 V =Responds to Voice  
 P =Responds to Pain  
 U =Unresponsive

#### PUPILLARY ASSESSMENT

Pupil size in mm/reaction

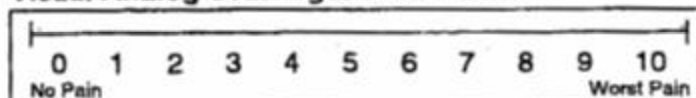
N = Normal                      S =Sluggish                      F =Fixed

3mm                      4mm                      5mm                      6mm                      7mm                      8mm

**APPENDIX M PEDIATRIC EMERGENCY REFERENCE (con't)****Wong-Baker Faces Pain Rating Scale****FLACC Scale**

Categories	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractable	Difficult to console or comfort

Each of the five categories (F) Face; (L) Legs; (A) Activity; (C) Cry; (C) Consolability is scored from 0-2, which results in a total score between zero and ten.

**Visual Analog Scale ages 7 and above**

## APPENDIX N - INTERFACILITY TRANSFER GUIDELINES

The Executive Committee of the Emergency Medical Care Advisory Board (EMCAB) voted final approval of the attached Administrative Requirement (A/R) 5-509 at their meeting on Monday, May 11, 1998.

A/R 5-509 re-defines policies and procedures regarding the provision of Advanced Life Support during transport of stable patients from one health care facility to another. The attached A/R replaces previous policy documents, particularly the Department's "ADVISORY LETTER, Ambulance Transport of Inter-Hospital Transfer Patients," dated March 25, 1991.

This A/R has an effective date of May 11, 1998. **It is important to note, however, that ambulance services may not implement the provisions of A/R 5-509 until EMTs have successfully completed the required minimum training.** Ambulance services may implement A/R 5-509 once staff is appropriately trained and the service has documented that training to the relevant regional council(s).

**By no later than January 1, 1999, ambulance services providing ALS during interfacility transfers must do so in compliance with the provisions of A/R 5-509.**

In the interim, until documentation of completion of personnel training is provided to the appropriate region(s), ambulance services must provide ALS Inter-hospital transfers in conformance with current Department policies and prevailing Regional ALS interfacility transfer protocols.



**A/R 5-509****OFFICE OF EMERGENCY MEDICAL SERVICES****Administrative Requirements Manual**

Effective: 05/01/98

Authorization:

Page: 1 of 7

Revised: 05/26/99

A/R Title: ALS INTERFACILITY TRANSFERS

Supersedes: Advisory Letter, Ambulance Transport of Inter-hospital  
Transfer Patients; March 25, 1991

**Purpose:**

1. To establish statewide **minimum standards** for the provision of Advanced Life Support (ALS) to stable patients requiring medical transport from one health care facility to another by ambulance services currently licensed in Massachusetts and by Emergency Medical Technicians (EMTs) - Paramedics (Paramedics) currently certified in Massachusetts.
2. To amend current minimum standards for ALS Inter-Hospital Transfers promulgated in the Department's "ADVISORY LETTER, Ambulance Transport of Inter-Hospital Transfer Patients," dated March 25, 199, relative to the following:
  - (a) inclusion of the transfer of patients from health care facilities other than licensed, acute care hospitals;
  - (b) expansion of the scope of services provided by duly licensed ambulance services and certified EMTs during inter-facility transfers;
  - (c) establishment of minimum requirements for the training of EMTs involved in the provision of ALS services to patients during inter-facility transfers;
  - (d) establishment of minimum requirements for Quality Assurance/Quality Improvement of ALS Inter-Facility Transfers;
  - (e) definition of procedures to be followed in carrying out ALS Inter-Facility Transfers.

**Relevant Documents:**

1. Massachusetts Emergency Medical Services (EMS) Regulations (105 CMR 170.000);
2. "Non-Emergency Inter-Facility Transfer" Protocol;
3. Massachusetts Statewide EMS Treatment Protocols;
4. Administrative Requirement 5-510: Hospital-Based Physician Medical Direction;
5. Administrative Requirement 5-255: ALS Inter-Facility Staffing Waiver;
6. The Emergency Medical Treatment and Active Labor Act, 42 USCS ss. 1395dd (EMT ALA);
7. Regional Uniform Treatment Protocols;
8. Medication & Equipment List (Attachment A); and
9. Guidelines: ALS Interfacility Training Programs (Attachment B).

**A/R 5-509****ALS INTERFACILITY TRANSFERS****Definitions:**

For the purpose of this Administrative Requirement, the following definitions shall apply:

1. “ALS Inter-Facility Transfer”

The transport by ambulance from one health care facility to another of a sick or injured patient who does **not** require emergency response and transport but requires medical treatment and/or monitoring of an on-going medical treatment, consistent with the scope of practice (See Attachment A) of EMT-Intermediates and/or EMT-Paramedics, and/or EMT-Basics if there is a waiver of staffing requirements pursuant to A/R 5-255.

2. “Health Care Facility”

Any health care setting where patients will be stabilized such that an emergency ambulance response is not required. This will require the supervision and/or on-site presence of a physician and other individuals trained and equipped to provide such care.

3. “Stable Patient”

Patients must either be evaluated and determined to be stable by a physician on-site at the sending facility or deemed to be stable for ambulance transport by the attending physician. A patient shall be considered stable if (1) at the time the transfer decision is made, the patient’s medical condition does not exceed the care capability of the transferring ambulance, **and** (2) deterioration of the patient’s medical condition to a level that exceeds the care capability in the transferring ambulance is **not** anticipated during the transport.

**Authority:**

The Massachusetts EMS Regulations provide for scheduled ambulance transfers, including the transfer of patients by ambulance between health care facilities, as well as for emergency response (170.001 and 17.256). The minimum standards for the provision of ALS (170.985-107.999) address scope of practice, affiliation agreements, operating policies and procedures, vehicles, equipment, supplies, registration with Massachusetts Division of Food and Drugs, communications, personnel, training and staffing. These standards apply to scheduled, non-emergency transport, including the ambulance transport of patients between health care facilities who require ALS services that duly licensed ambulance services and their duly certified EMTs provide.

**Minimum Standards for ALS Inter-Facility Transfers:**

1. Staffing, Training

Minimum staffing at the Intermediate level requires one EMT-Basic and one EMT-Intermediate. Minimum staffing at the Paramedic level requires two EMT-Paramedics, except when a waiver is issued by the Department as follows:

- a. to allow Paramedic level staffing with one EMT-Paramedic and EMT-Intermediate pursuant to 105 CMR 170.999(C), or

**A/R 5-509****ALS INTERFACILITY TRANSFERS**

- b. to allow Paramedic level staffing with one EMT-Paramedic and one EMT-Basic pursuant to 105 CMR 170.999 (C) (1) (c) and in conformance with Administrative Requirement 5-255.

Recommendations for EMT staffing on Inter-Facility Transfers, developed by the Medical Services Standing Committee of the Emergency Medical Care Advisory Board (EMCAB) are included below, (4. Scope of Practice).

EMT personnel involved in providing ALS services to patients during Inter-Facility Transfers must meet the following requirements:

- a. be currently certified as an EMT in Massachusetts; and
- b. have completed Department approved supplemental training that is specific to and consistent with the levels of certification of involved EMTs and includes
  - expanded roles and responsibilities;
  - additional, approved treatment modalities, equipment, devices and technologies; and
  - ambulance service policies and procedures regarding ALS Inter-Facility Transfers.

Guidelines for the approval of ALS Inter-Facility training programs shall be issued separately by the Department (See Attachment B). It shall be the responsibility of the transferring ambulance service to ensure and to verify appropriate training of its personnel providing ALS Inter-Facility Transfers.

## 2. Affiliation Agreements; Medical Control

An ambulance service must be licensed at an ALS level by the Department to provide ALS care during Inter-Facility Transfers, and it must maintain an agreement for Medical Control, on-line medical direction and quality assurance with a hospital with an emergency department staffed by physicians twenty-four hours each day (105 CMR 170.986).

Administrative Requirement 5-510 clarifies what is meant by “a hospital based physician”. While the physician is not required to be physically present in the hospital when giving medical direction for ALS inter-facility transfers, the physician must be responsible to and an agent of the hospital when functioning as a Medical Control physician. The physician must function within the hospital's existing quality assurance / quality improvement structure.

The Medical Services Standing Committee makes the following recommendations regarding qualifications for physicians providing Medical Control / Medical Direction for ALS inter-facility transfers:

- currently licensed as a physician and in the active practice of medicine in Massachusetts;
- emergency physician with demonstrated knowledge and experience in the EMS system and pre-hospital medical care;
- experienced in providing medical control to paramedic level ambulance service (in some cases, state and/or regional guidelines may permit certain physician critical care specialists with proven EMS experience);
- additional education in and familiarity with EMT ALA legislation;

**A/R 5-509****ALS INTERFACILITY TRANSFERS**

- credentialed by the ambulance service's affiliate hospital to provide on-line medical direction'
- provides medical control/medical direction under the auspices of the ambulance service's affiliate hospital;
- continuing medical control relationship with the transferring ambulance service, its paramedics, and medical director; and
- commitment to prompt and consistent availability to intervene or otherwise communicate with paramedics or staff from transferring and, if appropriate, receiving facilities when questions and/or problems arise, including at a minimum:
  - ◊ the clinical situation of the patient;
  - ◊ appropriateness of the transfer including, at a minimum, denials of transfer;
  - ◊ need for additional personnel or equipment; and
  - ◊ issues related to EMT ALA.

**3. Communications:**

A 1991 amendment to the Statewide EMS Communications Plan supports the use of alternative methods of ambulance-to-hospital communication, such as cellular telephones, for inter-facility transfers. Provisions for using radio medical control are specified in the state Communication Plan. Ambulance services choosing to communicate via cellular telephone, or other acceptable alternative, must document communications between ambulance and medical control physician, for example, by tape recording all medical communications.

**4. Scope of Practice:**

Section 170.256.A of the EMS Regulations states, "No ambulance service or agent thereof shall transport a patient between health care facilities who is receiving medical treatment that is beyond the training and certification capabilities of the EMTs staffing the ambulance unless an additional health care professional with that capability accompanies the patient..."

The scope of practice for each EMT level is defined (1) in regulation (sections 170.810, 170.820 and 170.840), (2) through established training programs approved by the Department, and (3) through Regional Uniform Treatment Protocols. The care that may be rendered to a patient in an ambulance during an inter-facility transfer, shall be consistent with the "Non-Emergency Inter-Facility Transfer" protocol which shall be promulgated as a component of the Statewide EMS Treatment Protocols.

NOTE: Under the provisions of the EMT ALA, the transfer of a patient from one hospital to another health care facility is appropriate only if the patient is accompanied by qualified personnel using qualified equipment. IT IS THE OBLIGATION OF THE TRANSFERRING HOSPITAL TO DETERMINE WHAT A PATIENT'S NEEDS ARE AND TO ASSURE THAT THE PATIENT'S NEEDS WILL BE MET DURING TRANSFER. The provisions of EMT ALA apply only to a hospital's obligation for an appropriate transfer; not to other health care facilities.

The Medical Services Standing Committee of the Emergency Medical Care Advisory Board (EMCAB) developed the following patient condition classifications and corresponding requirements for EMT personnel during ambulance transport:

**A/R 5-509****ALS INTERFACILITY TRANSFERS**

- a. Routine, scheduled transport. Patient clearly stable with no requirement for airway management, IV maintenance and/or cardiac monitoring.

Minimum Staffing: BLS licensed ambulance service; two EMT-Basics.

- b. Patient clearly stable (as above) who, however, has a “maintenance” IV running without medications in the solution; for example, cancer patient transported for radiation therapy, with unadulterated IV solution running.

Minimum Staffing: ALS-Intermediate licensed ambulance service; one EMT-Intermediate and one EMT-Basic.

- c. Patient with an acute or subacute problem, who is either completely or at least, to the best of an institution’s ability, stabilized; who has the potential to become less stable during transportation. Instrumentation or medication running MUST be consistent with “Non-Emergency Inter-Facility Transfer” protocol.

Minimum Staffing: ALS- Paramedic licensed ambulance service; two EMT-Paramedics; or, if the ambulance service has been issued the appropriate staffing waiver, one EMT-Paramedic and one EMT-Intermediate or one EMT-Basic.

- d. Patient with an acute problem with high potential to become unstable. Critical care patient with multiple IVs with any other instrumentation or medication running that is NOT included in the “Non-Emergency Inter-Facility Transfer” protocol.

Minimum Staffing: Appropriate additional medical personnel (per 170.256(a)) must accompany the patient during transfer; any level of ambulance service licensure; two EMT-Basics.

Under no circumstances shall EMTs function or be assigned to transfers beyond, or potentially beyond, the scope of their training and level of certification. The scope of practice for all EMTs is limited to the levels of EMT certification and training and by licensure level of the ambulance service by which they are employed.

**If (1) a patient’s medical condition necessitates immediate transport to another health care facility and (2) the patient’s medical treatment during transport will exceed the level of licensure of the transferring ambulance service and/or level of certification of the transferring ambulance’s personnel, and (3) the transferring facility will not provide appropriate additional personnel pursuant to 105 CMR 170.256(a), the transferring ambulance service shall be required to activate an emergency ambulance response.**

The transferring facility may at any time opt to exceed these minimum requirements by transferring patients in BLS ambulances with appropriate medical personnel as defined in 170.256(a).

**A/R 5-509****ALS INTERFACILITY TRANSFERS****5. Quality Assurance/Quality Improvement**

Ambulance services providing ALS inter-facility transfers shall be required to have quality assurance / quality improvement policies specific to ALS inter-facility transfers in conjunction with both Medical Control physicians and their ambulance service medical directors.

Ambulance services shall report to the Department any violations of 105 CMR 170.000, this Administrative Requirement and/or prevailing treatment protocols as they relate to ALS inter-facility transfers.

EMT skill maintenance and didactic knowledge will be continually assessed and appropriate measures taken to ensure quality of patient care by Medical Control physicians and by ambulance service Medical Directors.

**Patient ALS Transfer Procedure**

Once an ALS Inter-Facility Transfers has been deemed appropriate by the transferring ambulance service (see "Scope of Practice" above), paramedic staff, upon arrival at the transferring facility, will (1) receive a report from the staff of the transferring facility, (2) assess the patient and (3) provide a concise, complete and accurate patient report to the Medical Control physician. The report should include, at a minimum, the following information:

- names of transferring and receiving facilities;
- patient's diagnosis;
- reason(s) for transfer;
- brief history of present illness and any intervention(s) which has occurred to date;
- pertinent physical findings;
- vital signs;
- current medications and IV infusions;
- presence of or need for additional medical personnel;
- anticipated problems during transport, if any; and
- staffing configuration of the transporting ambulance.

One crew member will begin patient preparation for transport while the other contacts the Medical Control physician.

The Medical Control physician and paramedic will discuss with the transferring physician the orders for maintenance of existing and/or addition of new therapies according to the needs of the patient, within the scope of existing treatment protocols and EMT scope of practice.

In the case of an unstable patient, or lack of availability of the transferring physician, the Medical Control physician may recommend to the transferring facility additional therapies prior to the transfer of the patient in the interest of patient safety and quality care.

In some situations, consistent with the intent of EMT ALA provisions, the transfer of an unstable patient may be preferable to keeping that patient at a facility incapable of providing stabilizing care. If the transferring facility cannot provide appropriate medical personnel, an emergency ambulance response, including contacting the local designated emergency provider, must be activated.

**A/R 5-509****ALS INTERFACILITY TRANSFERS**

When a facility sends its own staff with the patient during a transfer (additional medical personnel) and the patient decompensates enroute, the Paramedic shall notify the Medical Control physician for guidance and/or orders.

If the accompanying staff is an RN s/he will maintain patient care responsibility, functioning within his/her scope of practice and under the orders of the transferring physician. The Paramedic and the RN will work collaboratively in the provision of patient care. If the patient's condition deteriorates enroute, the Paramedics may assume full responsibility in conjunction with the Medical Control physician for care that exceeds the RN's scope of practice and/or the transferring physician's medical orders.

If the accompanying staff includes a physician from the transferring facility, that physician shall be in charge of patient care. Coordination of patient care between the physician-in-charge and the Paramedic's treatment protocols and lines of command shall be effected prior to transfer.

Paramedics **MUST** contact their Medical Control physician in all circumstances.

**Interstate ALS Inter-Facility Transfers**

Interstate transfers are permitted. Paramedics must obtain Medical Control through normal channels, through the Affiliation Agreement for Medical Control of the ambulance service for whom they are working. Appropriate provisions for re-contacting the Medical Control physician enroute, if necessary, should be made prior to departure from the transferring facility. If a transfer originates out of state and no contact with Medical Control physician is possible, the transfer should be made at the BLS level only with appropriate additional personnel provided by the transferring facility.

## MEDICATION & EQUIPMENT LIST

(EMT-P Expanded Scope of Practice)

Any of the following **Medications**, not currently part of the EMT-Paramedic Statewide Treatment Protocols, may be used in the Interfacility Transfer mode, if they have been instituted by the sending facility. Otherwise stated, the transfer paramedics may **continue** and **monitor**, but not **institute** these medications and infusions, except as superseded by the Statewide Treatment Protocols.

IV Aminophylline Infusions

IV Antibiotics

10% Dextrose

IV Diltiazem Infusions

Dobutamine (Dobutrex)

Glycoprotein IIb / IIIa Inhibitors

IV Heparin

IV Insulin Infusions (**Patients in Diabetic Ketoacidosis**)

Lactated Ringers

Magnesium Sulfate Infusions

Mannitol Infusions

Meperidine (Demerol)

Midazolam (Versed)

Morphine Sulfate Infusions

IV Nitroglycerin

Nitropaste

Potassium Chloride Infusions

Procainamide

### **IV Sodium Bicarbonate infusions**

All Standard IV Infusions (1/2 NS, D5 1/2 NS, D5 1/4 NS, D5W, LR, etc.)

IV Steroids

TPN administered through central or peripheral IV lines

The following additional **equipment / monitoring skills\*** will be added:

Auto vents

PA lines (Swan Ganz)

Chest Tubes / Pleurivac

Femoral Sheath

Central lines

Feeding tubes

Infusion pumps

\* Based upon accepted in-service training and certification and, as above, these skills are directed at the **continuation and monitoring** of these devices, and not their **institution** or **initiation**, which have been accomplished at the sending facility. (Note: Intra-aortic balloon pumps are specifically **excluded**, and will require appropriately trained / certified personnel for use during Interfacility transfer).



## ALS INTERFACILITY TRAINING PROGRAMS

TOPIC:	ALS Interfacility Transfers: Guidelines for training programs for the EMT-Paramedic doing ALS interfacility transfers.
OBJECTIVE:	To enhance the EMT-Paramedic's understanding and ability to properly monitor/treat the patient during the ALS interfacility transfer.
GOALS:	<p>To provide, in a formal setting, an educational component to increase the skill and knowledge level of the field EMT-Paramedic.</p> <p>To provide an introduction to the medications included in the expanded scope of practice of the EMT-Paramedic during an ALS interfacility transfer.</p> <p>To introduce the working EMT-Paramedic to new equipment, its utilization and operation during ALS interfacility transfers.</p> <p>To provide an overview of the state requirements and medical/legal ramifications of ALS interfacility transfers.</p> <p>(Optional) To review techniques and interventions to be used in advanced skill scenarios as they pertain to the ALS interfacility transfer. This will include chest decompression, intraosseous infusions, needle cricothyroidotomy, and tracheal suctioning.</p>
TEACHING METHODS:	<p>Lecture/discussion</p> <p>Video Presentation</p> <p>Demonstration</p> <p>Role Playing</p> <p>Hands-on Practice</p>
RESOURCE:	<p>PHYSICIAN'S DESK REFERENCE 1997</p> <p>EMERGENCY PARAMEDIC CARE, Brady 3rd Edition</p> <p>EMERGENCY CARE IN THE STREETS, Caroline, 5th Edition</p> <p>PULSE OXIMETRY IN PREHOSPITAL CARE, Ohmeda, 1990</p> <p>CRITICAL CARE MANUAL, Wilson, 2nd Edition</p> <p>Commonwealth of Massachusetts, Pre-Hospital Treatment Protocols, 1998</p> <p>COBRA/EMTALA Regulations</p> <p>ACEP Policy Statement for Interfacility Patient Transfer</p> <p>ACEP Policy Statement for Physician Medical Direction of EMS Educational Programs</p>
MEDICAL DIRECTOR:	As per OEMS requirements and ACEP policy.
ASSISTING FACULTY:	Nurse(s), pharmacist(s), EMT-Paramedic(s), and respiratory therapist(s) with experience and expertise in the specific subject matter of a given topic.

**OUTLINE**

- |    |  |          |
|----|--|----------|
| A. | Introduction<br>The history of ALS Interfacility Transfer<br>The Interfacility Arena: Roles and Responsibilities   | 30 min.  |
| B. | Medical/Legal Aspects<br>1. Medical Direction: ACEP Position Paper - Medical Direction and Education Support<br>2. COBRA/EMT ALA (Consolidated Omnibus Budget Reconciliation Act, PL 88-272 Regulations/Examination and Treatment for Emergency Medical Conditions and Woman Labor Act)<br>3. Regional/State Regulations<br>4. ACEP Position Paper - ALS Transfer<br>5. Comfort Care   | 60 min.  |
| C. | Review of Current Pre-hospital Care ALS<br>1. Medications<br>2. Procedures<br>3. 911/ALS Transfer<br>4. Non-Emergency Department Physician - COBRA Required Education  | 30 min.  |
| D. | Introduction/Review of Medication Commonly Utilized<br>1. Medication Review <ul style="list-style-type: none"> <li>• Classification</li> <li>• Actions/Interactions</li> <li>• Pharmacology</li> <li>• Administration/Dosage</li> <li>• Cautions/Side Effects</li> <li>• Protocols</li> <li>• Care Parameters/Ranges</li> </ul> 2. Aminophylline Drips<br>3. Intravenous Antibiotics<br>4. Blood Products<br>5. Dextrose 10% (D10)<br>6. Intravenous Digoxin<br>7. Dilantin Infusions<br>8. Intravenous Diltiazem Infusions<br>9. Dobutamine (Dobutrex)<br>10. Glycoprotein IIb / IIIa Inhibitors<br>11. Intravenous Heparin<br>12. Insulin Infusions (Pts. with DKA)<br>13. Magnesium Infusions<br>14. Mannitol Infusions<br>15. Meperidine (Demerol)<br>16. Midazolam (Versed)<br>17. Morphine Sulfate Infusions<br>18. Nitroglycerin Infusions<br>19. Nitropaste<br>20. Paralytic Agents (infusions and intermittent additional dose(s): Vecuronium, succinylcholine)<br>21. Potassium Chloride Infusions<br>22. Procainamide<br>23. Standard IV Infusions (1/2 NS, D5 1/2 NS, D5 1/4 NS, D5, NS, LR, etc.)<br>24. Intravenous Steroids (methylprednisolone, Solucortef, etc.)<br>25. Thrombolytic Agents; (Streptokinase, TPA, etc.)<br>26. Total/Partial Parenteral Nutrition (TPN/PPN) Central and/or Peripheral Lines | 240 min. |

A/R Attachment B - Page 2

Any other medications approved by the state.

- E. Continuous Quality Improvement 30 min.
1. Off-Line Medical Direction
  2. Patient Care report Audits
  3. Review and Audit of All Problematic Transport
- F. ALS Skills - Review Lecture / Video Presentation 120 min.
1. Mandatory Skills
    - a) Tracheal Suctioning
    - b) Infusion Pumps
    - c) Central Line Troubleshooting
      - PA Lines
      - Arterial Lines
    - d) Nasogastric Tubes
    - e) Auto Vents
    - f) Chest Tubes / Pleurivac
  2. Optional Skills
    - a) End Tidal CO2 Detection
    - b) Chest Decompression
    - c) Intraosseous Infusions
    - d) Needle Cricothyrotomy
    - e) Pulse Oximetry
    - f) Peak Flow Pressures

Any other skills approved by the state for interfacility patient transfers.

- G. Practical Skill Lab 120 min.
- Station 1: Tracheal Suctioning  
Auto Vents  
Pulse Oximetry  
End Tidal CO2
- Station 2: IV Infusion Pumps  
Medication Administration  
Central Lines (Monitor, Access & Troubleshooting)  
Arterial Lines  
Venous Access Devices  
NG Tubes  
Foley Catheter
- Station 3: (Optional)  
Chest Decompression  
Intraosseous Infusions  
Needle Cricothyrotomy
- H. Case Studies of "Typical" ALS Interfacility Transfers 60 min.
- I. Examination 30 min.

Minimum Total Time: 12 hours

## **APPENDIX O – SPECIAL PROJECTS**

1. OEMS supports the concept of pre-hospital clinical research projects. Any service that plan to conduct a study which will add to or alter the existing statewide treatment protocols, must apply for a special project waiver as outlined in the special project waiver administrative requirements (AR 5-211).
2. The AR 5-211 may be downloaded from the OEMS website at:  
<http://www.state.ma.us/dph/oems/admin.htm>

Thank you.

## APPENDIX P - APGAR SCORE

The APGAR scoring system provides a mechanism for documenting the newborn's condition at specific intervals after birth. The five objective signs are assessed at one (1) and five (5) minutes of age.

**NOTE: The APGAR score should be documented, but should not be used to determine need for resuscitation, because resuscitative efforts, if required, should be initiated promptly after birth.**

SIGN	0 POINTS	1 POINT	2 POINTS
HEART RATE	ABSENT	< 100	> 100
RESPIRATORY EFFORT	ABSENT	WEAK CRY	STRONG CRY
MUSCLE TONE	FLACCID	SOME FLEXION	ACTIVE MOTION
REFLEX IRRITABILITY	NO RESPONSE	GRIMACE	COUGH, SNEEZE OR CRY
COLOR	BLUE, PALE	BODY: PINK EXTREMITIES: BLUE	FULLY PINK

**APPENDIX Q THE BOSTON STROKE SCALE (BOSS)\*:****(Modified from the Cincinnati Stroke Scale)****FACIAL DROOP** (*Patient shows teeth or smiles*)

Normal: Both sides of face move equally

Abnormal: One side of face does not move as well as the other

**ARM DRIFT** (*Patient closes eyes and extend both arms straight out for 10 seconds.*)

Normal: There is no drift at all or both arms drift the same

Abnormal: One arm drifts/moves down compared to the other arm or one arm noticeably weaker than the other.

**SPEECH** (*Score first attempt: Patient repeats, e.g. "The sky is blue in Boston."*)

Normal: The Patient says the correct words with no slurring of words on first attempt.

Abnormal: The patient slurs words, says the wrong words or is unable to speak on first attempt

**APPENDIX R FIBRINOLYTIC CHECKLIST**

**\*Note:** This checklist is intended only as a tool for the pre-hospital identification of patients with significant contraindication(s) to the administration of fibrinolytics in the acute ST elevation M.I. (STEMI) setting. It is not intended to be a comprehensive list of all factors to be considered prior to administration of these agents. Significant contraindications may warrant the triage of these patients to facilities capable of percutaneous intervention (PCI).

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Medic Unit: \_\_\_\_\_ Receiving Facility: \_\_\_\_\_

Patient Name: \_\_\_\_\_ Age: \_\_\_\_\_ Est. Wt.: \_\_\_\_\_ lbs (\_\_\_\_\_ kgs)

Duration of Chest Pain\*: \_\_\_\_\_ Hours \_\_\_\_\_ Minutes \*( $>20$  minutes and  $<12$  Hours)

**Exclusions** \_\_\_\_\_ (? = unknown)

- |  |              |
|--|--------------|
| 1. Is patient unconscious or exhibiting altered mental status?   | Yes / No     |
| 2. Is patient on oral anticoagulants? (e.g., Coumadin)   | Yes / No / ? |
| 3. Is blood pressure consistently $> 180/110$ mm Hg.?  | Yes / No     |
| 4. GI or GU bleeding, or known bleeding condition, in past 2 weeks?<br>(e.g., actively bleeding, black tarry stool, hematemesis, hematuria?)         | Yes / No / ? |
| 5. Any history of esophageal varices or active peptic ulcer?   | Yes / No / ? |
| 6. Recent major surgery, major trauma (incl. CPR) within last 2 weeks?<br>(including open biopsy, puncture or catheterization of chest/neck vessel?) | Yes / No / ? |
| 7. History of AAA or known dissection or aneurysm of aorta?<br>(pain radiating through to the back?)   | Yes / No / ? |
| 8. Any history of CVA, TIA, cerebral bleeding, aneurysm, AVM or brain tumor?   | Yes / No / ? |
| 9. Pregnancy?  | Yes / No / ? |
| 10. Treatment with fibrinolytics in past 6 months?<br>(OR - known allergy to fibrinolytic drugs in the past)   | Yes / No / ? |

12-lead ECG: Time obtained: \_\_\_\_\_ Results: \_\_\_\_\_

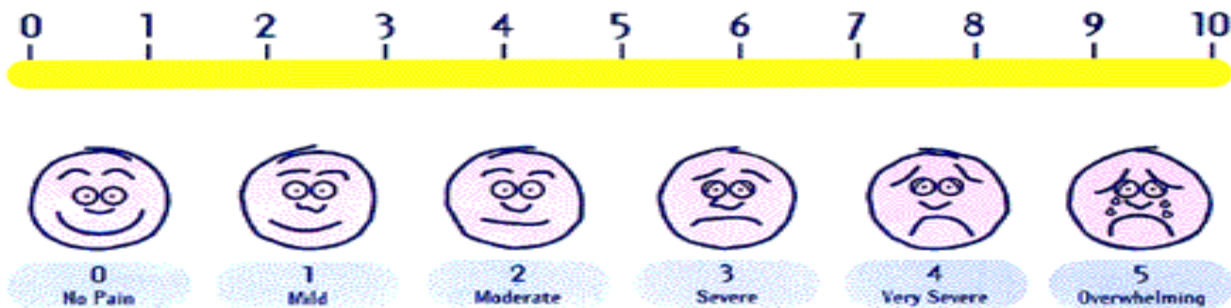
Compatible with AMI? (ST  $\uparrow >1$ mm in 2 contiguous leads) Yes / No / ?

**Is patient likely to be eligible for Fibrinolytic Therapy?** Yes / No / ?

Receiving Physician: \_\_\_\_\_ Time: \_\_\_\_\_

Paramedic No. \_\_\_\_\_ Signature: \_\_\_\_\_

## APPENDIX S ADULT PAIN MANAGEMENT ASSESSMENT GUIDE



### PAIN ASSESSMENT GUIDE

#### TELL ME ABOUT YOUR PAIN

#### Words to describe pain

aching	throbbing	shooting
stabbing	gnawing	sharp
tender	burning	exhausting
tiring	penetrating	nagging
numb	miserable	unbearable
dull	radiating	squeezing
crampy	deep	pressure

#### Pain in other languages

itami	Japanese	dolor	Spanish
tong	Chinese	douleur	French
dau	Vietnamese	bolno	Russian

#### Intensity (0-10)

If 0 is no pain and 10 is the worst pain imaginable, what is your pain now? ... in the last 24 hours?

#### Location

Where is your pain?

#### Duration

Is the pain always there?  
Does the pain come and go? (Breakthrough Pain)  
Do you have both types of pain?

#### Aggravating and Alleviating Factors

What makes the pain better?  
What makes the pain worse?

#### How does pain affect

sleep	energy	relationships
appetite	activity	mood

#### Are you experiencing any other symptoms?

nausea/vomiting	itching	urinary retention
constipation	sleepiness/confusion	weakness

#### Things to check

vital signs, past medication history, knowledge of pain, and use of noninvasive techniques

REFERENCES: Jussis A, Carr DB, Payne R, et al. Management of Chronic Pain. Clinical Practice Guidelines No. 9. AHCPR Publication No. 24-0592. Rockville, MD: Agency for Health Care Policy and Research, U.S. Department of Health and Human Services, Public Health Service; March 1994. Wong D, and Whalley L. Clinical Handbook of Pediatric Nursing, ed 2. The C.V. Mosby Company, St. Louis, 1986, p. 372.

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## APPENDIX T NERVE AGENT DOSING & REFERENCE TABLES

SEVERITY	CHOLINERGIC AGENT SIGNS & SYMPTOMS	ADULT TREATMENT STANDING ORDERS
Mild	Runny nose Cough Pupils may be pinpoint Eye pain Lacrimation	Decontaminate Administer 100% oxygen Administer <b>One</b> Mark I kit IM <b>OR</b> 2 mg atropine IM <b>only &amp;</b> either: 600 mg IM pralidoxime <b>OR</b> 1 gm IV pralidoxime
Moderate	Runny nose Cough Sweating, twitching Nausea, abdominal cramping Weakness Localized sweating (seen with dermal exposure) Eye pain, trouble seeing Wheezing, shortness of breath	Decontaminate Administer 100% Administer <b>Two</b> Mark I kits IM <b>OR</b> 4 mg atropine IM <b>only &amp;</b> either: 600-1200 mg IM pralidoxime <b>OR</b> 1 gm IV pralidoxime
Severe	All the above plus: Vomiting Diarrhea Drooling, copious respiratory secretions Significant weakness Seizures Decreased level of consciousness Apnea	Decontaminate Administer 100% oxygen Administer <b>Three</b> Mark I kits IM <b>OR</b> 6 mg atropine IM <b>only &amp;</b> either: <b>1200 -1800 mg IM pralidoxime OR</b> 1 gm IV pralidoxime <b>&amp;</b> <i>one of the following:</i> Diazepam 10 mg IM Autoinjector (CANA kit) <b>OR,</b> Diazepam 10 mg IM/IV <b>OR,</b> Lorazepam 2-4 mg IM/IV <b>OR,</b> Midazolam 5-10 mg IM/IV

**NOTE: Dermal absorption of nerve agents may lead to delayed symptom onset up to 18 hours after exposure. Initial symptoms/signs may only be local such as localized fasciculation and sweating.**

**NOTE: Do not administer an adult dose to a child < 50 kg**

**APPENDIX T NERVE AGENT DOSING & REFERENCE TABLES****Pediatric Dosing for Nerve Agent Exposures**

Kg	<b><u>NERVE AGENT: IM, IV, IO</u></b>					
	Atropine	Pralidoxime	Midazolam	Diazepam	Lorazepam	
	0.02-0.05mg/kg	20-40mg/kg	0.1mg/kg	0.25 mg/kg	0.05-0.2 mg/kg	
1	Premie 0.1 mg	20-40 mg	0.05-0.1 mg	0.25 mg	0.05-0.2 mg	
2	Newborn 0.1 mg	40-80 mg	0.1-0.2 mg	0.5 mg	0.1-0.4 mg	
5	3 mos 0.1-0.25 mg	100-200 mg	0.25-0.5 mg	1.25 mg	0.25-1 mg	
10	12 mos 0.2-0.5 mg	200-400 mg	0.5-1 mg	2.5 mg	0.5-2 mg	
15	2-3 yrs 0.3-0.75 mg	300-600 mg	1-1.5 mg	3.75 mg	0.75-3 mg	
20	4-7 yrs 0.4-1 mg	400-800 mg	2 mg	5 mg	1-4 mg	
25	6-9 yrs 0.5-1.25 mg	500 mg-1 g	2.5 mg	6.25 mg	1.25-4 mg	
30	7-11 yrs 0.6-1.5 mg	600 mg-1 g	3 mg	7.5 mg	1.5-4 mg	
35	8-13 yrs 0.7-1.75 mg	700 mg-1 g	3.5 mg	8.75 mg	1.75-4 mg	
40	9-14 yrs 0.8-2 mg	800 mg-1 g	4 mg	10 mg	2-4 mg	
45	10-16 yrs 0.9-2 mg	900 mg-1 g	4.5 mg	10 mg	2.25-4 mg	
50	11-18 yrs 1-2 mg	1 g	5 mg	10 mg	2.5-4 mg	
55	12-18 yrs 1.25-2 mg	1 g	5 mg	10 mg	2.75-4 mg	
60	13-18 yrs 1.5-2 mg	1 g	5 mg	10 mg	3-4 mg	
65	14-18 yrs 2 mg	1 g	5 mg	10 mg	3.25-4 mg	
70	16-18 yrs 2 mg	1 g	5 mg	10 mg	3.5-4 mg	
Berlin DM Jr. Pediatrics 1970, 40:793						

**APPENDIX T NERVE AGENT DOSING & REFERENCE TABLES****PEDIATRIC ATROPENS****Pediatric Atropine Dosing for Nerve Agent Toxicity Using Pediatric Atropens**

Weight	Mild	Moderate	Severe
15-40 lb (7-18 kg)	1 x 0.5 mg Atropen	1 x 1 mg Atropen	3 x 0.5 mg Atropen
40-90 lb (18-41 kg)	1 x 1 mg Atropen	1 x 2 mg Atropen	3 x 1 mg Atropen
>90 lb (41 kg)	1 x 2 mg Atropen	2 x 2 mg Atropen	3 x 2 mg Atropen

**Note: Pralidoxime reduced dose pediatric autoinjectors are not available**

~ ~ ~

**ADULT AUTOINJECTORS****Pediatric Dosing for SEVERE Nerve Agent Toxicity Using Adult Autoinjectors**

(I.E. seizures, hypotension, coma, cardiac arrest)

Use only if Pediatric Atropen or when Atropine/Pralidoxime vials are not available

Approximate age	Approximate weight	Number of autoinjectors (each type)	Atropine dosage range (mg/kg)	Pralidoxime dosage range (mg/kg)
3-7 yrs	13-25 kg	1	0.08-0.13	24-46
8-14 yrs	26-50 kg	2	0.08-0.13	24-46
>14 yrs	>51 kg	3	0.11 or less	35 or less

- **NOTE: Mark I kits are not approved for pediatric use, however, they should be used as initial therapy in circumstances for children with severe life-threatening nerve agent toxicity when IV therapy is not available. This assumes 0.8 inch needle insertion depth.**
- **NOTE: Potential high dose of atropine and pralidoxime for age/weight. However, these numbers are within the general guidelines recommended for the first 60-90 minutes of therapy after a severe exposure.**
- **NOTE: Administer injection in large muscle mass. Avoid deltoid. Suggest using thigh.**
- **REFERENCE:** Pediatric Preparedness for Disasters and Terrorism: A National Consensus Conference, Executive summary 2003. Markenson D, Redlener I.. AHRQ, DHHS, EMSC Program of the Maternal and Child Health Resources Services Administration

## **APPENDIX T    NERVE AGENT DOSING & REFERENCE TABLES**

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## **BIBLIOGRAPHY**

1. "Paramedic Emergency Medicine". Brady. Prentice Hall Division. Bledsoe, Porter, Shade et al. *Third Edition*. 1997.
2. "Mosby's Paramedic Textbook". Sanders, Lewis, Quick et al. Mosby-Year Book, Inc. 1997 Edition.
3. "Advanced Emergency Care for Paramedic Practice". J.P. Lippincott Company. Jones, Weigel. White, McSwain and Breiter et al. 1992 Edition.
4. "Mosby's EMT-Basic Textbook". Mosby-Year Book, Inc. Stoy, Barclay et al. 1996.
5. "Emergency Care". Brady / Prentice Hall. O'Keefe, Limmer, Grant, Murray, Bergeron, et al. Eighth Edition. 1998.
6. "Emergency Care in the Streets". Little, Brown & Company. Nancy L. Caroline, M.D. Fifth Edition. 1994.
7. "Advanced Pediatric Life Support". American Academy of Pediatrics. American College of Emergency Physicians. Bushore, Seidel, Fleisher, Wagner. 1995 Edition.
8. "Advanced Pediatric Emergency Care". Emergency Medical Services for Children. New Jersey Department of Health. 1996.
9. "Basic Pre-Hospital Pediatric Emergency Care". Emergency Medical Services for Children. New Jersey Department of Health. 1996.
10. "Pre-Hospital Care Protocols and Standing Orders". State of Rhode Island and Providence Plantations. Department of Health. 1995.
11. "Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care". American Heart Association. 1992 National Conference Edition.
12. "The Basic EMT: Comprehensive Pre-Hospital Patient Care". Mosby Lifeline. McSwain, White, Paturas and Metcalf. First Edition. 1997.
13. "Medical Direction of Emergency Medical Services". American College of Emergency Physicians. Werman et al. 1993 Edition.
14. "Manual of Pre-Hospital Emergency Medicine". Mosby Year Book, Inc. Miller, Wilson et al. 1992 Edition.

15. "Emergency Care & Transportation". Jones & Bartlett Publishing. American Academy of Orthopedic Surgeons. Seventh Edition. 1999.
16. "EMS Field Guide: A Pocket Reference for EMS Professionals". ALS Version. LeSage, Derr, Tardiff et al. Tenth and Eleventh Editions, 1994 and 1996.
17. "EMS Field Guide: A Pocket Reference for BLS and Intermediate Providers". BLS and Intermediate Version. Tardiff, Derr, LeSage et al. 1996 Edition.
18. "Pre-Hospital Treatment Protocols". Maine Emergency Medical Services. 1994.
19. "Regional Protocols": Commonwealth of Massachusetts. Various Editions.
20. "Paramedic Field Care". Peter Pons, et al, American College of Emergency Physicians. 1997 Edition.
21. "Essentials of Emergency Care: A Refresher for the Practicing EMT-B", Brady Publishing, Limmer, Elling & O'Keefe. Second Edition. 1999.
22. "Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care". American Heart Association. International Consensus on Science.
23. Pediatric Preparedness for Disasters and Terrorism: A National Consensus Conference, Executive summary 2003. Markenson D, Redlener I.. AHRQ, DHHS, EMSC Program of the Maternal and Child Health Resources Services Administration
24. Berlin DM Jr. Pediatrics; 1970, 40:793



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46

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47

MEPERIDINE (DEMEROL)

48

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49

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## PREGNANCY CATEGORY RATINGS FOR DRUGS

Drugs have been categorized by the Food and Drug Administration (FDA) according to the level of risk to the fetus. These categories are listed for each herein under “Pregnancy Safety” and are interpreted as follows:

- **Category A:** Controlled studies in women fail to demonstrate a risk to the fetus in the first trimester, and there is no evidence of risk in later trimesters; the possibility of fetal harm appears to be remote.
- **Category B:** Either (1) animal reproductive studies have not demonstrated a fetal risk but there are no controlled studies in women or (2) animal reproductive studies have shown an adverse effect (other than decreased fertility) that was not confirmed in controlled studies on women in the first trimester and there is no evidence of risk in later trimesters.
- **Category C:** Either (1) studies in animals have revealed adverse effects on the fetus and there are no controlled studies in women or (2) studies in women and animals are not available. Drugs in this category should be given only if the potential benefit justifies the risk to the fetus.
- **Category D:** There is positive evidence of human fetal risk, but the benefits for pregnant women may be acceptable despite the risk, as in life-threatening diseases for which safer drugs cannot be used or are ineffective. An appropriate statement must appear in the “Warnings” section of the labeling of drugs in this category.
- **Category X:** Studies in animals and humans have demonstrated fetal abnormalities, there is evidence of fetal risk based on human experience, or both; the risk of using the drug in pregnant women clearly outweighs any possible benefit. The drug is contraindicated in women who are or may become pregnant. An appropriate statement must appear in the “Contraindications” section of the labeling of drugs in this category.

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## ***CLASSIFICATION OF THERAPEUTIC INTERVENTIONS IN CPR AND ECC***

A system of classifying recommendations based on strength of the supporting scientific evidence was used.

- **Class I** - A therapeutic option that is usually indicated, always acceptable, and considered useful and effective.
- **Class II** - A therapeutic option that is acceptable, is of certain efficacy, and may be controversial.
- **Class IIa** - A therapeutic option for which the weight of evidence is in favor of its usefulness and efficacy.
- **Class IIb** - A therapeutic option that is not well established by evidence but may be helpful and probably is not harmful.
- **Class III** - A therapeutic option that is inappropriate, is without scientific supporting data, and may be harmful.

## ACTIVATED CHARCOAL

### Class

Adsorbent

### Mechanism of Action

Adsorbs toxic substances from the GI Tract; Onset of action is immediate.

### Indications

Most oral poisonings and medication overdoses; can be used after evacuation of poisons.

### Contraindications

Oral administration to comatose patient; after ingestion of corrosives, caustics or petroleum distillates (ineffective and may induce vomiting); simultaneous administration with other oral drugs.

### Adverse Reactions

May induce nausea and vomiting; may cause constipation; may cause black stools.

### Drug Interactions

Bonds with and generally inactivates whatever it is mixed with, e.g., syrup of ipecac.

### How supplied

25 gm (black powder) / 125 ml bottle (200 mg/ml)

50 gm (black powder) / 250 ml bottle (200 mg/ml)

### Dosage and Administration

Note, if not in **Pre-mixed** slurry, dilute **with 1-part charcoal/ 4 parts water**.

**Adult: 1-2 gm/kg PO or via NGT**

**Pediatric: 1-2 gm/kg PO or via NGT**

### Duration of action

depends upon GI function; will act until excreted.

### Special Considerations

Often used in conjunction with magnesium citrate

Must be stored in a closed container

Does **not** adsorb cyanide, lithium, iron, lead and arsenic.

**ADENOSINE (ADENOCARD)****Class**

Endogenous Nucleotide

**Mechanism of action**

Slows conduction time through the AV Node; can interrupt re-entrant pathways; slows heart rate; acts directly on sinus pacemaker cells. Is drug of choice for PSVT. Can be used diagnostically for stable, wide-complex tachycardias of unknown type after two doses of Lidocaine.

**Indications**

Conversion of **PSVT to sinus rhythm. May convert PSVT due to Wolff-Parkinson-White syndrome.**  
**Not effective in converting atrial fibrillation / flutter.**

**Contraindications**

Second or third-degree " block or Sick Sinus Syndrome  
Atrial flutter / atrial fibrillation  
Ventricular Tachycardia  
Hypersensitivity to adenosine

**Adverse Reactions**

Facial flushing, shortness of breath, chest pain, headache, paresthesia, diaphoresis, palpitations, hypotension, nausea, metallic taste.

**Drug Interactions**

Methylxanthines (theophylline-like drugs) antagonize the effects of adenosine.  
Dipyridamole (Persantine) potentiates the effects of adenosine  
Carbamazepine (Tegretol) may potentiate the AV Node blocking effects of adenosine.  
May cause bronchoconstriction in asthmatic patients.

**How Supplied**

Three mg/ml in 2-ml flip-top vials for IV injection

**Dosage and Administration**

**Adult: 6 mg over 1-3 seconds; If no response after 1-2 minutes, administer 12 mg over 1-3 seconds, Maximum total dose = 30 mgs.**  
**Pediatric: 0.1 - 0.2 mg/kg rapid IV; maximum single dose = 12 mgs.**

**Duration of action**

Onset and peak effects in seconds; duration 12 seconds.

**Special Considerations**

Short half-life limits side effects in most patients.  
Pregnancy safety: Category C.

**ALBUTEROL (PROVENTIL, VENTOLIN)****Class**

Sympathomimetic, bronchodilator.

**Mechanism of Action**

Selective b-2 agonist which stimulates adrenergic receptors of the sympathomimetic nervous system resulting in smooth muscle relaxation in the bronchial tree and peripheral vasculature.

**Indications**

Treatment of bronchospasm in patients with reversible obstructive airway disease (**COPD/asthma**). Prevention of exercise-induced bronchospasm.

**Contraindications**

Known prior hypersensitivity reactions to Albuterol.  
Tachycardia dysrhythmias, especially those caused by digitalis.  
Synergistic with other sympathomimetics

**Adverse Reactions**

Often dose-related and include restlessness, tremors, dizziness, palpitations, tachycardia, nervousness, peripheral vasodilatation, nausea, vomiting, hyperglycemia, increased blood pressure and paradoxical bronchospasm

**Drug Interactions**

Tricyclic antidepressants may potentiate vasculature effects.  
Beta-blockers are antagonistic.  
May potentiate hypokalemia caused by diuretics.

**How Supplied**

Solution for aerosolization: 0.5% (5 mg/ml)  
Metered Dose Inhaler: 90 mcg/metered spray (17 gm canister with 200 inhalations)  
Syrup: 2 mg/5 ml

**Dosage and Administration**

**Adult: Administer 2.5 mg. Dilute 0.5 ml of 0.5% solution for inhalation with 2.5 ml normal saline in nebulizer and administer over 10-15 minutes.**

**MDI: 1-2 inhalations (90-180 mcg). Five minutes between inhalations**

**Pediatric: Administer solution of 0.01 - 0.03 ml (0.05 - 0.15 mg/kg/ dose diluted in 2 ml of 0.9% Normal Saline. May repeat every 20 minutes three times.**

**Duration of Action**

Onset in 5-15 minutes with peak effect in 30-minutes - two hours and duration of 3-4 hours.

**Special Considerations**

Pregnancy Safety: Category C.  
Antagonized by beta-blockers (e.g., Inderal, Lopressor).  
May precipitate angina pectoris and dysrhythmias.  
Should only be administered by inhalation methodology in pre-hospital management.

**AMINOPHYLLINE****Class**

Xanthine bronchodilator (theophylline derivative).

**Mechanism of Action**

Respiratory stimulator and bronchodilator.

**Indications**

Limited usefulness in EMS arena although may be used in refractory COPD patients; interfacility transfers; bronchospasm.

**Contraindications**

Allergy to xanthines, e.g., caffeine; cardiac dysrhythmias.

**Adverse Reactions**

Tachycardia, palpitations, PVCs, Angina pectoris, headache, seizure, nausea and vomiting.

**Drug Interactions**

Beta blockers may oppose effects; Barbiturates and phenytoin may decrease theophylline levels.

**How Supplied**

500 mg / 10 ml ampule; 500 mg / 20 ml ampule (preload) 25 mg/ml; 250 mg / ml ampule (preload).

**Dosage and Administration**

**Loading dose (Adult): 5-6 mg / kg in 60-100 ml of diluent over 30 min. IV infusion not to exceed 20 mg/min.;**

**Loading dose (Pediatric): 5-6 mg / kg in 50-100 ml; diluent IV infusion.**

**Maintenance infusion**

**Adult: First 12 hours: 0.5-0.7 mg/kg/hour (lower doses for elderly, CHF, liver disease). Subsequent: 0.1-0.5 mg/kg/hour (based on serum aminophylline levels)**

**Pediatric: 1.0 mg/kg/hour.**

**Duration of Action**

Onset less than 15 minutes; Duration 4.5 hours.

**Special Considerations**

Pregnancy safety: Category C;

Use with caution in patients with cardiovascular disease., hypertension or hepatic/renal disease.

Doses should be halved in patients already taking theophylline preparations.

Therapeutic to toxic ratio is narrow!



**AMIODARONE (CORDARONE)****Class**

Antidysrhythmic.

**Mechanism of Action**

Prolongation of Action Potential; non-competitive alpha and beta sympathetic blocking effects; Calcium channel blocking effects.

**Indications**

Suppression of Ventricular Fibrillation refractory to defibrillation and Lidocaine.  
Suppression of Ventricular Tachycardia refractory to cardioversion and Lidocaine.

**Contraindications**

Second or Third Degree heart block..  
Medication-induced Ventricular dysrhythmias.  
Hypotension, Bradycardia, Torsades de Pointes.  
Profound Sinus Bradycardia.

**Adverse Reactions**

Hypotension, Bradycardia, Pulseless Electrical Activity, Congestive Heart Failure.  
Nausea, fever, abnormal Liver Function Tests, Thrombocytopenia.

**Drug Interactions**

Will precipitate with Sodium Bicarbonate: incompatible.  
Compatible with: Dopamine, Dobutamine, Isoproterenol, Lidocaine, NTG,  
Norepinephrine, Phenylephrine, KCL, Procainamide.

**How Supplied:**

150 mg in 3 ml vials.

**Dosage and Administration**

Adult: 300 mg slow IV Push over 1-2 minutes in 10 cc Normal Saline, (For ACLS  
VF/ Pulseless VT)

IV Drip 0.5-1mg per minute. (For malignant ventricular arrhythmias) per ordering  
physician.

**Duration of Action:**

Onset: Within 5-15 minutes.

Peak Effect: Variable.

Duration: Variable

**Special Considerations**

Pregnancy safety: Category C

Maintain at room temperature and protect from light in storage (light protection not  
required during administration).

Hypotension usually responsive to slowing infusion rate, IV Normal Saline.

Administer cautiously in patients with Heart Failure or poor systolic function.

May be especially effective in high-risk patients with recent acute MI.

**AMYL NITRITE, SODIUM NITRITE, SODIUM THIOSULFATE  
(CYANIDE ANTIDOTE KIT)****Class**

Antidote

**Mechanism of Action**

Amyl Nitrite: affinity for cyanide ions; reacts with hemoglobin to form methemoglobin (low toxicity)

Sodium Nitrite: same as amyl nitrite

Sodium Thiosulfate: produces thiocyanate, which is then excreted

**Indications**

Cyanide or hydrocyanic acid poisoning.

**Contraindications**

Not applicable.

**Adverse reactions**

Excessive doses of amyl nitrite and sodium nitrite can produce severe, life-threatening methemoglobinemia. Use only recommended doses.

**Drug Interactions**

None.

**How supplied**

Amyl nitrite: in pledgettes similar to ammonia capsules.

**Dosage and administration**

Adult: Amyl nitrite: breathe 30 seconds out of every minute. Sodium Thiosulfate and sodium nitrite: IV per antidote kit directions.

Pediatric: Same as adult.

**Duration of Action**

Variable.

**Special Considerations**

Cyanide poisoning must be recognized quickly and treated quickly; if pulse persists, even in presence of apnea, prognosis is good with treatment. The antidote kit must be used in conjunction with administration of oxygen.

**ASPIRIN****Class:**

Platelet inhibitor, anti-inflammatory agent.

**Mechanism of Action:**

Prostaglandin inhibition.

**Indications:**

New onset chest pain suggestive of Acute Myocardial Infarction.

Signs and symptoms suggestive of recent cerebrovascular accident.

**Contraindications:**

Hypersensitivity.

Gastrointestinal bleeding.

**Adverse Reactions:**

Heartburn.

GI bleeding.

Nausea, vomiting.

Wheezing in allergic patients.

Prolonged bleeding.

**Drug Interactions:**

Use with caution in patients allergic to NSAIDs.

**How Supplied:**

160 mg or 325 mg tablets (chewable and standard).

**Dosage and Administration:**

160 mg or 325 mg PO.

**Duration of Action:**

Onset: 30-45 minutes.

Peak effect: variable.

Duration: Variable.

**Special Considerations:**

Pregnancy Safety: Category D.

Not recommended in pediatric population.

**ATROPINE SULFATE****Class:**

Anticholinergic agent.

**Mechanism of Action:**

Parasympatholytic: inhibits action of acetylcholine at postganglionic parasympathetic neuroeffector sites.

Increases heart rate in life-threatening bradydysrhythmias.

**Indications:**

Hemodynamically significant bradycardia.

Asystole.

Drug of choice for organophosphate poisoning.

Bronchospastic pulmonary disorders.

**Contraindications:**

Tachycardia.

Hypersensitivity.

Unstable cardiovascular status in acute hemorrhage and myocardial ischemia.

Narrow-angle glaucoma.

**Adverse Reactions:**

Headache, dizziness, palpitations, nausea and vomiting.

Tachycardia, dysrhythmias, anticholinergic effects (blurred vision, dry mouth, urinary retention).

Paradoxical bradycardia when pushed slowly or at low doses.

Flushed, hot dry skin.

**Drug Interactions:**

Potential adverse effects when administered with digoxin, cholinergics, physostigmine.

Effects enhanced by antihistamines, procainamide, quinidine, antipsychotics, benzodiazepines and antidepressants.

**How Supplied:**

Prefilled syringes: 1.0 mg in 10 ml of solution.

Nebulizer: 0.2% (1 mg in 0.5 ml) and 0.5% (2.5 mg in 0.5 ml).

**Injection Solution as Sulfate: 0.5mg/ml (1ml); 1mg/ml (1ml);**

**0.1mg/ml (5ml,10ml); 0.4mg/ml (1ml, 20ml)**

**Autoinjectors: (See Nerve Agent Antidote)**

**Dosage and Administration:****Adult:**

- **Bradydysrhythmias: 0.5 - 1.0 mg IV every 3-5 minutes as needed to maximum total dose of 0.04 mg / kg. (may be given Endotracheally if IV not established: 2.0 mg followed by 2.0 ml of Normal Saline Solution).**
- **Asystole: 1.0 mg IV push every 3-5 minutes as needed to maximum total dose of 0.04 mg / kg (may be given Endotracheally if IV not yet established: 2.0 mg followed by 2.0 ml Normal Saline Solution).**

**Pediatric:**

**ATROPINE SULFATE (cont.)**

- **Bradydysrhythmias:** 0.2 mg / kg IV / ET / IO (minimum single dose 0.1 mg, maximum single dose 1.0 mg). If administered via ET, follow with 2.0 ml sterile Normal Saline Solution.
  
- **Asystole:** Same as for Bradydysrhythmias: minimum dose 0.1 mg; maximum dose 0.5 mg for a child and 1.0 mg for adolescent.

**Duration of Action:**

Onset: Immediate.

Peak Effect: Rapid to 1-2 minutes.

Duration: 2-6 hours.

**Special Considerations:**

Pregnancy Safety: Category C.

Moderate doses dilate pupils.

**ATROVENT® (IPRATROPIUM BROMIDE)**

**Class:** Bronchodilator

**Mechanism of Action:** Blocks the action of acetylcholine at the parasympathetic sites in bronchial smooth muscle causing bronchodilation.

**Indications:** Used in bronchospasm especially associated with COPD, and emphysema.

**Contraindications:** Hypersensitivity to atropine or its derivatives.

**Adverse Reactions:**

Ipratropium is poorly absorbed from the lung, so systemic effects are rare.

>10% CNS: Dizziness, Headache, Nervousness  
Respiratory: Cough

1-10% Cardiac: Hypotension, palpitations

**How Supplied:** Nebulizing Ampule: 0.02% (2.5ml)  
Inhaler: 18mcg/actuation

**Dosage and Administration:**

**Adult:** 2-3 puffs via metered dose inhaler (MDI) tid-qid; maximum 12 puffs/day.  
ALT: 500mcg **NEB** q 6-8hrs (may mix neb solution with Albuterol if used within 1 hour)

**Pediatric:** < 12 yo: 1-2 puffs(MDI) tid-qid; max: 8 puffs  
ALT: 250mcg **NEB** q 6-8hrs (may mix neb solution with Albuterol if used within 1 hour)

**Kinetics:**

Onset: 1-3 minutes after administration

Peak effects: Within 1.5- 2 hours

Duration of Action: Up to 4-6 hours

T1/2: 2 hrs after inhalation

**Special Considerations**

Pregnancy Safety: Category B.

**CALCIUM CHLORIDE / CALCIUM GLUCONATE****Class**

Electrolyte.

**Mechanism of Action**

Increases cardiac contractile state (positive inotropic effect).

May enhance ventricular automaticity.

**Indications**

Hypocalcemia, magnesium sulfate overdose, hyperkalemia, calcium channel blocker toxicity.

Adjunctive therapy in treatment of insect bites and stings.

**Contraindications**

Hypercalcemia, VF during cardiac resuscitation; digitalis toxicity.

**Adverse Reactions**

Bradycardia, asystole, hypotension, peripheral vasodilation, metallic taste, local necrosis, coronary and cerebral artery spasm, nausea, vomiting.

**Drug Interactions**

May worsen dysrhythmias secondary to digitalis.

May antagonize effects of Verapamil.

Flush line before and after administration of sodium bicarbonate.

**How Supplied**

10% solution in 10 ml ampules, vials and prefilled syringes (100 mg/ ml).

**Dosage and Administration**

**Adult: 2-4 mg/kg of 10% solution slowly IV over 5 minutes; may repeat in 10 minutes. (maximum: 1 gm dose)**

**Pediatric: 20 mg/kg/dose of 10% solution slow IV/ IO (maximum: 1 gm dose); (may repeat in 10 minutes.)**

**Duration of Action**

Onset: 5-15 minutes.

Peak effects: 3-5 minutes.

Duration: 15-30 minutes but may persist for 4 hours (dose dependent).

**Special Considerations**

Pregnancy safety: Category C.

For pediatrics: if calcium gluconate is unavailable, 1-2 ml of 10% calcium chloride solution, diluted with IV fluid, may be substituted.

**DEXAMETHASONE SODIUM PHOSPHATE (DECADRON, HEXADROL)****Class**

corticosteroid.

**Mechanism of Action**

Suppresses acute and chronic inflammation; immunosuppressive effects.

**Indications**

Anaphylaxis, asthma, spinal cord injury, croup, elevated intracranial pressure (prevention and treatment), as an adjunct to treatment of shock.

**Contraindications**

Hypersensitivity to product.

**Adverse Reactions**

Hypertension, sodium and water retention, GI bleeding, TB.  
None from single dose.

**Drug Interactions**

Calcium  
Metaraminol.

**How Supplied**

100 mg/ 5 ml vials or 20 mg/1 ml vials.

**Dosage and Administration**

**Adult: 10-100 mg IV (1 mg/kg slow IV bolus). (considerable variance through Medical Control).**

**Pediatric: 0.25-1.0 mg/kg/dose IV, IO, IM.**

**Duration of Action**

Onset: Hours.  
Peak effects: 8-12 hours.  
Duration of action: 24-72 hours.

**Special Consideration**

Pregnancy safety: unknown.  
Protect medication from heat.  
Toxicity and side effects with long-term use.



**DEXTROSE****Class**

Carbohydrate, hypertonic solution.

**Mechanism of Action**

Rapidly increases serum glucose levels.

Short-term osmotic diuresis.

**Indications**

Hypoglycemia, altered level of consciousness, coma of unknown etiology, seizure of unknown etiology, status epilepticus (controversial).

**Contraindications**

Intracranial hemorrhage, delirium tremens, ineffective without thiamine,

**Adverse Reactions**

Extravasation leads to tissue necrosis.

Warmth, pain, burning, thrombophlebitis, rhabdomyositis.

**Drug Interactions**

Sodium bicarbonate, coumadin.

**How Supplied**

25 gm/ 50 ml pre-filled syringes (500 mg/ml)

**Dosage and Administration**

**Adult: 12.5-25 gram slow IV; may be repeated as necessary.**

**Pediatric: 0.5-1 gm/kg/dose slow IV; may be repeated as necessary.**

**Duration of Action**

Onset: less than 1 minute.

Peak effects: variable.

Duration: Variable.

**Special Considerations**

Administer thiamine prior to D50 in known alcoholic patients.

Draw blood sugar before administering.

Do not administer to patients with known CVA unless hypoglycemia documented.

**DIAZEPAM (VALIUM)****Class**

Benzodiazepine, sedative-hypnotic, anticonvulsant.

**Mechanism of Action**

Potentiates effects of inhibitory neurotransmitters.

Raises seizure threshold.

Induces amnesia and sedation.

**Indications**

Acute anxiety states, acute alcohol withdrawal, muscle relaxant, seizure activity, agitation.

Analgesia for medical procedures (fracture reduction, cardioversion).

Delirium tremens.

**Contraindications**

Hypersensitivity, glaucoma. coma, shock, substance abuse, head injury.

**Adverse Reactions**

Respiratory depression, hypotension, drowsiness, ataxia, reflex tachycardia, nausea, confusion, thrombosis and phlebitis.

**Drug Interactions**

Incompatible with most drugs, fluids.

**How Supplied**

10 mg/5 ml prefilled syringes, ampules, vials and Tubex..

**Dosage and Administration**

**Seizure activity: Adult: 5-10 mg IV q 10-15 minutes prn (5 mg over 5 min.)(maximum dose = 30 mgs.)**

**Seizure activity: Pediatric: 0.2-0.3 mg/kg/dose IV every 15-30 minutes (no faster than 3 mg over 5 minutes) (max. = 10 mg/kg). Rectal diazepam: 0.5 mg/kg via 2" rectal catheter and flush with 2-3 ml air after administration.**

**Sedation for cardioversion: 5- 15 mg IV over 5-10 minutes prior to cardioversion.**

**Duration of Action**

Onset: 1-5 minutes.

Peak effect: minutes.

Duration: 20-50 minutes.

**Special Considerations**

Pregnancy safety: Category D

Short duration of anticonvulsant effect.

Reduce dose 50% in elderly patient.

**DIAZOXIDE (HYPERSTAT)****Class**

Vasodilator.

**Mechanism of Action**

Non-diuretic antihypertensive; arteriolar vasodilatation.

**Indications**

Hypertensive crisis, especially in pre-eclampsia.

**Contraindications**

Hypotension, dissecting aortic aneurysm, labor.

**Adverse Reactions**

Reflex tachycardia, angina, cerebral ischemia, CVA, dysrhythmia, hyperglycemia, nausea, vomiting.

**Drug Interactions**

Incompatible with heat, light or acid solutions.

**How Supplied:** 5 mg/ml 20 ml ampules.

**Dosage and Administration**

**Adult: 5 mg/kg IV push over 10-30 seconds.**

**Pediatric: 5 mg/kg IV push over 10-30 seconds.**

**Duration of Action**

Onset: Immediate.

Peak effects: 5 minutes.

Duration of action: 3-12 hours.

**Special Considerations**

Administer only to patient in supine position.

Extravasation can cause tissue necrosis.

**DIGOXIN (LANOXIN)****Class**

Inotropic Agent.

**Mechanism of Action**

Rapid-acting cardiac glycoside with direct and indirect effects which increase force of myocardial contraction, increase refractory period of AV node and increase Total Peripheral Resistance.

**Indications**

Congestive Heart Failure.

PSVT, especially Atrial Flutter and Atrial Fibrillation.

**Contraindications**

Ventricular Fibrillation.

Ventricular Tachycardia.

Digitalis Toxicity.

Hypersensitivity to Digoxin.

**Adverse Reactions**

Headache, weakness, blurred yellow or green vision, confusion, seizures,

Dysrhythmias, nausea, vomiting, skin rash.

**Drug Interactions**

Amiodarone, Verapamil, and Quinidine may increase serum Digoxin concentrations by 50-70%.

Concurrent use of Digoxin and Verapamil may lead to severe Heart Block.

Diuretics may potentiate cardiac toxicity.

**How Supplied**

2 ml ampules of 0.5 mg Digoxin; also: Tablets, capsules and elixirs.

**Dosage and Administration**

**Adult: 0.25 - 0.5 mg slow IV Push.**

**Pediatric: 25-40 mcg /kg slow IV Push.**

**Duration of Action:**

Onset: IV: 5-30 minutes; P.O.: 30-120 minutes.

Duration: several days.

**Special Considerations**

Pregnancy Safety: category A.

Patients receiving IV Digoxin must be on monitor.

Patients with known renal failure are prone to Digoxin Toxicity.

Hypokalemia, hypomagnesemia and hypercalcemia potentiate Digitalis Toxicity.

Use carefully in patients with Wolff-Parkinson-White Syndrome. (Ventricular Dysrhythmias).

**DILTIAZEM HCL (CARDIZEM, LYO-JECT)****Class:**

Calcium channel blocker.

**Mechanism of Action:**

Block influx of calcium ions into cardiac muscle: prevents spasm of coronary arteries.

Arterial and venous vasodilator.

Reduces preload and afterload.

Reduces myocardial oxygen demand.

**Indications:**

Control of rapid ventricular rates due to atrial flutter, atrial fibrillation, PSVT.

Angina pectoris.

**Contraindications:**

Hypotension, sick sinus syndrome, second or third degree AV block

Cardiogenic shock.

Wide-complex tachycardias.

**Adverse Reactions:**

Bradycardia, second or third-degree AV blocks, chest pain, CHF, syncope.

V-Fib, V-tach, nausea, vomiting, dizziness, dry mouth, dyspnea, headache.

**Drug Interactions:**

Caution in patients using medications that affect cardiac contractility.

In general, should not be used in patients on Beta-blockers.

**How Supplied:**

25 mg / 5 ml vial; 50 mg / 10 ml vial.

Non - refrigerated: LYO-JECT syringe.

**Dosage and Administration:**

Adult: Initial bolus: 0.25 mg/ kg (average dose 20 mg) IV over two (2) minutes. If inadequate response, may re-bolus in 15 minutes: 0.35 mg / kg IV over two (2) minutes. Maintenance infusion of 5-15 mg / hour.

Pediatric: not recommended.

**Duration of Action:**

Onset: 2-5 minutes.

Peak effect: Variable.

Duration: 1-3 hours.

**Special Considerations:**

Pregnancy safety: category C.

Use in caution in patients with renal or hepatic dysfunction.

PVCs may be noted at time of conversion of PSVT to sinus rhythm.

**DIPHENHYDRAMINE (BENADRYL)****Class**

Antihistamine; anticholinergic.

**Mechanism of Action**

Blocks cellular histamine receptors; decreases vasodilation; decreases motion sickness. Reverses extrapyramidal reactions.

**Indications**

Symptomatic relief of allergies, allergic reactions, anaphylaxis, acute dystonic reactions (phenothiazines).

Blood administration reactions; used for motion sickness, hay fever.

**Contraindications**

Asthma, glaucoma, pregnancy, hypertension, narrow angle glaucoma, infants, patients taking  
Monoamine Oxidase Inhibitors.

**Adverse Reactions**

Sedation, hypotension, seizures, visual disturbances, vomiting, urinary retention, palpitations, dysrhythmias, dry mouth and throat, paradoxical CNS excitation in children.

**Drug Interactions**

Potentiates effects of alcohol and other anticholinergics, may inhibit corticosteroid activity, MAOIs prolong anticholinergic effects of diphenhydramine.

**How Supplied**

Tablet: 25, 50 mg; Capsules: 25, 50 mg.

50 or 100 mg prefilled syringes, vials (IV or IM); elixir 12.5 mg/5 ml.

**Dosage and Administration**

**Adult: 25 - 50 mg IM or IV or P.O.**

**Pediatric: 1-2 mg/kg IV, IO slowly or IM. If given PO: 5 mg./ kg./ 24 hours.**

**Duration of Action**

Onset: 15-30 minutes.

Peak effect: 1 hour.

Duration: 3-12 hours.

**Special Considerations**

Not used in infants or in pregnancy: Category B.

If used in anaphylaxis, will be in conjunction with epinephrine, steroids.

**DOBUTAMINE (DOBUTREX)****Class**

Sympathomimetic, inotrope.

**Mechanism of Action**

Synthetic catecholamine. Increased myocardial contractility and stroke volume, increased cardiac output. Minimal chronotrope activity. Increases renal blood flow.

**Indications**

Cardiogenic shock, CHF, left ventricular dysfunction.

Often used in conjunction with other drugs.

**Contraindications**

Tachydysrhythmias, IHSS, severe hypotension.

**Adverse Reactions**

May increase infarct size in patient with MI, headache, dysrhythmias, hypertension, PVCs.

**Drug Interactions**

Incompatible with sodium bicarbonate and Furosemide.

Beta-blockers may blunt inotropic effects.

**How Supplied**

250 mg / 20 ml vials.

**DOSAGE AND ADMINISTRATION**

**Adult:** IV infusion at 2 - 20 mcg / kg / min. titrated to desired effect.

**Pediatric:** 2-20 mcg / kg / min. titrated to desired effect.

**Duration of Action**

Onset: 2 minutes.

Peak Effect: 10 minutes.

Duration: 1-2 minutes after infusion discontinued.

**Special Considerations**

Pregnancy safety: not well established.

Monitor blood pressure closely.

**DOPAMINE (INTROPIN)****Class**

Sympathomimetic, inotropic agent.

**Mechanism of Action**

Immediate metabolic precursor to Norepinephrine. Increases systemic vascular resistance, dilate renal and splanchnic vasculature. Increases myocardial contractility and stroke volume.

**Indications**

Cardiogenic, septic or spinal shock, hypotension with low cardiac output states. Distributive shock.

**Contraindications**

Hypovolemic shock, pheochromocytoma, tachydysrhythmias, VF.

**Adverse Reactions**

Cardiac dysrhythmias, hypertension, increased myocardial oxygen demand, extravasation may cause tissue necrosis.

**Drug Interactions**

Incompatible in alkaline solutions.

MAOIs will enhance effects of dopamine.

Beta blockers may antagonize effects of dopamine.

When administered with Phenytoin: may cause hypotension, bradycardia and seizures.

**How Supplied**

200 mg / 5 ml - 400 mg / 5 ml prefilled syringes, ampules for IV infusion.

400 mg in 250 ml D5W premixed solutions.

**Dosage and Administration**

**Adult: 2- 20 mcg / kg / min. (Rate determined by physician).**

**Pediatric: 2 - 20 mcg / kg / min. (Rate determined by physician).**

**Duration of Action**

Onset: 1-4 minutes.

Peak Effect: 5-10 minutes.

Duration: Effects cease almost immediately after infusion shut off.

**Special Considerations**

Pregnancy safety not established.

Effects are dose-dependent

Dopaminergic response: 2-4 mcg / kg / min.: dilates vessels in kidneys; inc. urine output.

Beta-adrenergic response: 4- 10 mcg / kg / min.: Increased chronotropy and inotropy

Adrenergic response: 10-20 mcg / kg / min.: Primarily alpha stimulant / vasoconstriction.

Greater than 20 mcg / kg / min.: reversal of renal effects / override alpha effects.

Always monitor drip rate.

Avoid extravasation injury.



**EPINEPHRINE (ADRENALIN)**

**Class:** Sympathomimetic.

**Mechanism of Action**

Direct acting alpha and beta agonist

Alpha: bronchial, cutaneous, renal and visceral arteriolar vasoconstriction.

Beta 1: positive inotropic and chronotropic actions, increases automaticity.

Beta 2: bronchial smooth muscle relaxation and dilation of skeletal vasculature

Blocks histamine release.

**Indications**

Cardiac arrest, asystole, PEA, VF unresponsive to initial defib.

Severe bronchospasm, asthma, bronchiolitis.

Anaphylaxis, acute allergic reactions.

**Contraindications**

Hypertension, hypothermia, pulmonary edema, coronary insufficiency, hypovolemic shock.

**Adverse Reactions**

Hypertension, dysrhythmias, pulmonary edema, anxiety, psychomotor agitation, nausea, angina, headache, restlessness.

**Drug Interactions**

Potentiates other sympathomimetics.

Deactivated by alkaline solutions.

MAOIs may potentiate effects of epinephrine.

**How Supplied**

**1 mg / ml (1:1,000) ampules and 0.1 mg / ml (1:10,000) prefilled syringes.**

**Auto-injectors: EPI-Pen: 0.3 mg / ml**

**EPI-Pen Jr.: 0.15mg/ml**

**Dosage and Administration**

**Adult**

**Allergic reactions and asthma: 0.3 - 0.5 mg (0.3 - 0.5 ml 1:1000) SC**

**Anaphylaxis: 0.3 - 0.5 mg (3- 5 ml 1:10,000) IV**

**Cardiac: (asystole, PEA, VF)**

**1 mg IV push (1:10,000) every 3- 5 minutes**

**Endotracheal: 2.0- 2.5 mg (1:1,000) every 3- 5 minutes in 10ml NS**

**Pediatric**

**Allergic reactions and asthma: 0.01 mg/kg (0.01 mL/kg 1:1000) SC to maximum of 0.5 mg.**

**Cardiac: (asystole, PEA, VF)**

**IV, IO: Standard initial dose: 0.01 mg/kg (1:10,000, 0.1mL/kg)**

**ET: 0.1 mg/kg (1:1,000, 0.1mL/kg)**

**Second and subsequent doses: 0.1 mg/kg (1:1000, 0.1mL/kg)**

**EPINEPHRINE (ADRENALIN) (cont.)****Duration of Action**

Onset: Immediate.

Peak Effects: Minutes.

Duration: Several minutes.

**Special Considerations**

Pregnancy safety: category C.

Syncope in asthmatic children.

If given ET, may dilute in sterile NS (10 ml in adults).

**EPINEPHRINE RACEMIC (MICRONEFRIN, VAPONEFRIN)****Class**

Sympathomimetic.

**Mechanism of Action**

Stimulates beta -2 receptors in lungs: bronchodilatation with relaxation of bronchial smooth muscles. Reduces airway resistance. Useful in treating laryngeal edema; Inhibits histamine release.

**Indications**

Bronchial asthma, prevention of bronchospasm.

Croup: laryngotracheobronchitis.

Laryngeal edema.

**Contraindications**

Hypertension, underlying cardiovascular disease, Epiglottitis.

**Adverse Reactions**

Tachycardia, dysrhythmias.

**Drug Interactions**

MAOIs may potentiate effects.

Beta-blockers may blunt effects.

**How Supplied**

MDI: 0.16-0.25 mg/ spray.

Solution: 7.5, 15, 30 ml in 1%, 2.25% solutions

**Dosage and Administration****Adult:**

**MDI: 2-3 inhalations, repeated every 5 minutes PRN.**

**Solution: dilute 5 ml (1%) in 5.0 ml NS, administer over 15 minutes.**

**Pediatric:**

**Solution: Dilute 0.25 ml (0.1%) in 2.5 ml NS (if less than 20 kg);**

**Dilute 0.5 ml in 2.5 ml NS (if 20-40 kg);**

**Dilute 0.75 ml in 2.5 ml NS (if greater than 40 kg)**

**Administer by aerosolization.**

**Duration of Action**

Onset: within 5 minutes.

Peak effect: 5- 15 minutes.

Duration: 1-3 hours.

**Special Considerations**

May cause tachycardias and other dysrhythmias.

Monitor Vital Signs.

Excessive use may cause bronchospasm.

**FUROSEMIDE (LASIX)****Class**

Loop diuretic.

**Mechanism of Action**

Inhibits electrolyte reabsorption and promotes excretion of sodium, potassium, chloride.

**Indications**

CHF; Pulmonary edema, hypertensive crisis.

**Contraindications**

Hypovolemia, anuria, hypotension (relative contraindication); hypersensitivity, hepatic coma.

**Adverse Reactions**

May exacerbate Hypovolemia, hypokalemia, ECG changes, dry mouth, hypochloremia, hyponatremia, hyperglycemia (due to hemoconcentration).

**Drug Interactions**

Lithium toxicity may be potentiated by sodium depletion.

Digitalis toxicity may be potentiated by potassium depletion.

**How Supplied**

100 mg / 5 ml, 20 mg / 2 ml, 40 mg / 4 ml vials.

**Dosage and Administration**

**Adult: 0.5-1.0 mg / kg injected slowly IV.**

**Pediatric: 1 mg / kg / dose IV, IO.**

**Duration of Action**

Onset: 5 minutes.

Peak Effects: 20-60 minutes.

Duration: 4-6 hours.

**Special Considerations**

Pregnancy safety: Category C.

Ototoxicity and deafness can occur with rapid administration.

Should be protected from light.

**GLUCAGON****Class**

Hyperglycemic agent, pancreatic hormone, insulin antagonist.

**Mechanism of Action**

Increases blood glucose by stimulating glycogenesis.

Unknown mechanism of stabilizing cardiac rhythm in beta-blocker overdose.

Minimal positive inotrope and chronotrope.

Decreases GI motility and secretions.

**Indications**

Altered level of consciousness when hypoglycemia is suspected.

May be used as inotropic agent in beta-blocker overdose.

**Contraindications**

Hyperglycemia, hypersensitivity.

**Adverse Reactions**

Nausea, vomiting.

Tachycardia, hypertension.

**Drug Interactions**

Incompatible in solution with most other substances.

No significant drug interactions with other emergency medications.

**How Supplied**

1 mg ampules (requires reconstitution with diluent provided)

**Dosage and Administration**

**Adult: 0.5 - 1 mg IM, SC, or slow IV; may repeat q 20 minutes PRN.**

**Pediatric: 0.03 - 0.1 mg / kg / dose (not to exceed 1 mg) q 20 min. IM, IO, SC, slow IV.**

**Duration of Action**

Onset: 1 minute.

Peak effect: 30 minutes.

Duration: Variable (generally 9-17 minutes).

**Special Considerations**

Pregnancy safety: Category C.

Ineffective if glycogen stores depleted.

Should always be used in conjunction with 50% dextrose whenever possible.

If patient does not respond to second dose glucagon, 50% dextrose must be administered.

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**GLUCOSE - ORAL (GLUCOLA, INTRA-GLUCOSE)****Class**

Hyperglycemic.

**Mechanism of Action**

Provides quickly absorbed glucose to increase blood glucose levels.

**Indications**

Conscious patients with suspected hypoglycemia.

**Contraindications**

Decreased level of consciousness, nausea, vomiting.

**Adverse Reactions**

Nausea, vomiting.

**Drug Interactions**

None.

**How Supplied**

Glucola: 300 ml bottles.

Glucose pastes and gels in various forms.

**Dosage and Administration**

**Adult: Should be sipped slowly by patient until clinical improvement noted.**

**Pediatric: Same as adult.**

**Duration of Action**

Onset: Immediate.

Peak Effect: Variable.

Duration: Variable.

**Special Considerations**

As noted in indications section.

**GLYCOPROTEIN IIb / IIIa INHIBITORS (Abciximab, Eptifibatide, Tirofiban)****Class**

Chimeric monoclonal antibody fragment specific for platelet glycoprotein IIb/IIIa receptors.

**Mechanism of Action**

Blocks Platelet aggregation and thrombus formation

**Indications**

Adjunct to percutaneous transluminal angioplasty.

Adjunct to thrombolytic agents.

Unstable angina not responsive to conventional medical therapy when percutaneous angioplasty is planned within 24 hours.

**Contraindications**

Active internal hemorrhage.

Clinically significant hemorrhage (GI, GU) within last 6 weeks.

Cerebrovascular accident within past 2 years.

Bleeding disorders.

Thrombocytopenia (low platelets / < 100,000)

Major surgery or trauma within last 6 weeks.

Intracranial tumor, A/V malformation or aneurysm.

Severe Hypertension, Vasculitis.

Use of Dextran before PTCA or intent to use Dextran during PTCA.

Hypersensitivity.

**Adverse Reactions**

Major bleeding.

Intracranial bleeding.

Thrombocytopenia.

**Drug Interactions**

Oral anticoagulants contraindicated.

Concurrent Dextran contraindicated.

Concurrent Heparin will increase risk of bleeding.

**How Supplied**

Intravenous doses (bolus / infusion), variable depending upon Brand utilized.

**Dosage and Administration**

Variable depending upon Brand utilized.

**Duration of Action**

Onset: Variable: 1.5 - 2.5 Hours.

Peak Effect: Variable: 2 - 3 Hours.

Duration: 2 Hours - 2 Days.

**Special Considerations**

Major bleeding in 14% of coronary angioplasty patients.

Bleeding from open areas may occur (catheter site).

Pregnancy Category: C

**HALOPERIDOL (HALDOL)****Class**

Tranquilizer, antipsychotic.

**Mechanism of Action**

Inhibits CNS catecholamine receptors: strong anti-dopaminergic and weak anticholinergic.

Acts on CNS to depress subcortical areas, mid-brain and ascending Reticular Activating System

**Indications**

Rarely used in pre-hospital arena.

Acute psychotic episodes.

**Contraindications**

Agitation secondary to shock or hypoxia.

Hypersensitivity.

**Adverse Reactions**

Extrapyramidal signs and symptoms, restlessness, spasms, Parkinson-like symptoms, drooling, dystonia, hypotension, orthostatic, hypotension, nausea, vomiting, blurred vision.

**Drug Interactions**

Enhanced CNS depression and hypotension in combination with alcohol.

Antagonized amphetamines and epinephrine.

Other CNS depressants may potentiate effects.

**How Supplied**

5 mg / ml ampule.

**Dosage and Administration**

**Adult: 2-5 mg IM every 30-60 minutes until sedation achieved.**

**Pediatric: Not recommended.**

**Duration of Action**

Onset: 10 minutes.

Peak effect: 30-45 minutes.

Duration: Variable (generally 12-24 hours).

**Special Considerations**

Pregnancy safety: Not established.

Treat hypotension secondary to Haldol with fluids and norepinephrine, not epinephrine.

Patient may also be taking Cogentin (benztropine mesylate) if on long-term therapy with Haldol.



**HEPARIN SODIUM****Class**

Anticoagulant.

**Mechanism of Action**

Prevents conversion of fibrinogen to fibrin and affect clotting factors: IX, XI, XII, plasmin.

Does not lyse existing clots.

**Indications**

Prophylaxis and treatment of : venous thrombosis, pulmonary embolus, coronary occlusion, disseminated intravascular coagulation (DIC), post-operative thrombosis.

To maintain patency of IV injection devices and indwelling catheters.

**Contraindication**

Hypersensitivity.

Patients on antiplatelet drugs (relative contraindication).

**Adverse Reactions**

Hemorrhage, thrombocytopenia, allergic reactions (chills, fever, back pain).

**Drug Interactions**

Salicylates, some antibiotics and quinidine may increase risk of bleeding.

**How Supplied**

Heparin lock flush solutions in 10 and 100-unit / ml ampules and prefilled syringes.

1,000 - 40,000 units / ml ampules.

**Dosage and Administration**

Adult: Loading dose: 80 units / kg IV; maintenance dose: 18 units / kg / hour IV.

Pediatric: Loading dose: 50 u / kg IV; maintenance dose: 7.5 units / kg / hour IV.

**Duration of Action**

Onset: Immediate.

Peak Effect: Variable.

Duration: 4 hours after continuous infusion discontinued.

**Special Considerations**

May be neutralized with protamine sulfate at 1 mg protamine / 100 u Heparin: give slowly IV over 1-3 minutes.

**HYDRALAZINE (APRESOLINE)****Class**

Vasodilator, antihypertensive.

**Mechanism of Action**

Decreases systemic vascular resistance by affecting arteriolar smooth muscle.

Decreases diastolic blood pressure more than systolic.

Increases cardiac output and stroke volume.

**Indications**

Moderate to severe hypertension (hypertensive crisis); (rarely required in pre-hospital setting).

Pre-eclampsia and eclampsia.

**Contraindications**

Hypotension, elevated intracranial pressure., known coronary artery disease, dissecting aneurysm.

**Adverse Reactions**

Hypotension, headache, reflex tachycardia, angina, MI, anxiety, diaphoresis, nausea, vomiting.

**Drug Interactions**

Concurrent use with diazoxide may result in severe hypotension.

**How Supplied**

20 mg / ml, 1 or 2 ml ampules

**Dosage and Administration**

**Adult: 10-40 mg IM or IV (slow over 1-2 minutes); may be repeated in 10 minutes PRN. Infusion: 20 mg in 250 ml NS at 5-20 mg / hr titrated to effect.**

**Pediatric: 0.1 - 0.2 mg / kg / dose q 4-6 hours IM, IV; may be repeated PRN. 0.75 - 3.0 mg / kg / q 6-12 hours, not to exceed 20 mg / day.**

**Duration of Action**

Onset: 5-10 minutes IV; 10-40 minutes IM.

Peak Effect: 10-80 minutes.

Duration: 2-6 hours.

**Special Considerations**

Pregnancy safety: category C.

Hepatic or renal failure will prolong drug action.

ECG and BP require continuous monitoring during administration.

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**HYDROCORTISONE SODIUM SUCCINATE (SOLU-CORTEF)****Class**

Corticosteroid.

**Mechanism of Action**

Anti-inflammatory and immunosuppressive with salt-retaining actions.

**Indications**

Shock due to acute adrenocortical insufficiency.

**Contraindications**

None if given as single dose.

**Adverse Reactions**

Only for long-term use.

**Drug Interactions**

Incompatible with heparin and metaraminol.

**How Supplied**

Vials with 100 mg, 250 mg, or 500 mg.

**Dosage and Administration**

**Adult: 4 mg / kg slow IV bolus.**

**Pediatric: 0.16-1.0 mg / kg slow IV bolus.**

**Duration of Action**

Onset: 1 hour.

Peak Effect: Variable.

Duration: 8-12 hours.

**Special Considerations**

May be used in status asthmaticus as a second line drug.

**HYDROXYZINE (ATARAX, VISTARIL)****Class**

Antihistamine, antiemetic, antianxiety agent.

**Mechanism of Action**

Potentiates effects of analgesics. Calming effect without impairing mental alertness.

**Indications**

To potentiate the effects of analgesics.

To control nausea and vomiting, anxiety reactions and motion sickness.

Preoperative and postoperative sedation.

**Contraindications**

Hypersensitivity.

**Adverse Reaction**

Dry mouth and drowsiness.

**Drug Interactions**

Potentiates the effects of CNS depressant such as narcotics, barbiturates and alcohol.

**How Supplied**

25, 50 mg / ml in 1 ml vials.

**Dosage and Administration**

**Adult: 25-100 mg IM.**

**Pediatric: 0.5 - 1.0 mg / kg / dose IM.**

**Duration of Action**

Onset: IM: 15- 30 minutes.

Peak Effect: 45 minutes to 1.5 hours.

Duration: 4-6 hours.

**Special Considerations**

Should be given by IM injection only.

Localized burning at injection is common complaint.

**INSULIN (REGULAR INSULIN, NPH, ULTRALENTE, HUMULIN, OTHERS)****Class**

Antidiabetic.

**Mechanism of Action**

Allows glucose transport into cells of all tissues; converts glycogen to fat; produces intracellular shift of potassium and magnesium to reduce elevated serum levels of these electrolytes.

**Indications**

Not used in emergency pre-hospital setting.  
Diabetic ketoacidosis or other hyperglycemic state.  
Hyperkalemia. (Insulin and D50 used together to lower hyperkalemic state).  
Non-ketotic hyperosmolar coma.

**Contraindications**

Hypoglycemia, hypokalemia.

**Adverse Reactions**

Hypokalemia, hypoglycemia,, weakness, fatigue, confusion, headache, tachycardia, nausea, diaphoresis.

**Drug Interactions**

Incompatible in solution with all other drugs..  
Corticosteroids, dobutamine, epinephrine and thiazide diuretics decrease the hypoglycemic effects of insulin.  
Alcohol and salicylates may potentiate the effects of insulin.

**How Supplied**

10 ml Vials of 100 Units / ml.

**Dosage and Administration**

**Dosage adjusted relative to blood sugar levels.**

**May be given SC, IM or IV.**

**Standard doses for diabetic coma**

**Adult: 10-25 units Regular insulin IV, followed by infusion of 0.1 units / kg / hour.**

**Pediatric: 0.1 - 0.2 units / kg / hour IV or IM followed by infusion: 50 units of regular insulin mixed in 250 ml of NS (0.2 units / ml), at a rate of 0.1 - 0.2 units / kg / hour.**

**Duration of Action**

Onset: Minutes

Peak Effect: Approximately 1 hour (short-acting); 3-6 hours (intermediate-acting); 5-8 hours (long-acting).

Duration: Approximately 6-8 hours (short-acting); 24 hour (intermediate-acting); 36 hour (long-acting).

**Special Considerations**

Insulin is drug of choice for control of diabetes in pregnancy.

Usually require refrigeration.

Most rapid absorption if injected in abdominal wall; next most rapid absorption: arm; slowest absorption if injected into the thigh.

**ISOETHARINE (BRONCHOSOL, BRONKOMETER)****Class**

Sympathomimetic.

**Mechanism of Action**

Beta-2 agonist; relaxes smooth muscle of bronchioles.

**Indications**

Acute bronchial asthma, bronchospasm (especially in COPD patient).

**Contraindications**

Use with caution in patients with Diabetes, hyperthyroidism, cardiovascular and cerebrovascular disease.

**Adverse Reactions**

Dose-related tachycardia, palpitations, tremors, nervousness, nausea.

Multiple doses can cause paradoxical bronchoconstriction.

**Drug Interactions**

Additive adverse effects if given with other beta-2 agonist drugs.

**How Supplied**

MDI; 2 ml unit-dose of 1% solution.

**Dosage and Administration**

**Adult: 1-2 inhalations with MDI. COPD: 2.5 - 5.0 mg (0.25 ml - 0.5 ml) diluted in 3 ml NS and nebulized.**

**Pediatric: 0.01 ml / kg; maximum dose: 0.5 ml diluted in 3 ml NS and nebulized.**

**Duration of Action**

Onset: immediate.

Peak Effect: 5-15 minutes.

Duration: 1-4 hours.

**Special Considerations**

None.

**ISOPROTERENOL (ISUPREL)****Class**

Sympathomimetic, synthetic catecholamine..

**Mechanism of Action**

Beta-agonist, especially beta-1: positive inotropy and chronotropy.

Bronchodilation (not used as such in pre-hospital setting).

**Indications**

Hemodynamically stable bradycardia resistant to atropine.

Heart blocks with palpable pulse.

Management of Torsades de pointes.

**Contraindications**

V-tach, VF, hypotension, pulseless idioventricular rhythm, ischemic heart disease, cardiac arrest.

**Adverse Reactions**

Tachycardias, dysrhythmias, angina pectoris, MI, tremors, anxiety, facial flushing.

**Drug Interactions**

MAOIs may potentiate effects.

Beta-adrenergic drugs may blunt effects.

Sympathomimetics may potentiate effects.

**How Supplied**

1 mg in 1 ml or 5 ml ampule and prefilled syringes.

**Dosage and Administration**

**Adult: Infusion at 2-10 mcg / min. or until desired heart rate is obtained.**

**Pediatric: 0.05-1.5 mcg / kg / min. IV infusion, titrated to patient response.**

**Duration of Action**

Onset: Immediate.

Peak effect: Minutes.

Duration: Minutes after infusion is discontinued.

**Special Considerations**

Pregnancy safety: Category C.

Increases myocardial consumption and can precipitate V-tach and VF.

May exacerbate tachydysrhythmias caused by digitalis toxicity.

Newer inotropes have replaced Isuprel in most clinical settings.

If electronic pacing available, it should be used in lieu of Isuprel or as soon as possible after drug has been initiated.

**KETOROLAC TROMETHAMINE (TORADOL IM)****Class**

Nonsteroidal anti-inflammatory (NSAID) Analgesic.

**Mechanism of Action**

NSAID that also exhibits peripherally acting non-narcotic analgesic activity by inhibiting prostaglandin synthesis.

**Indications**

Short-term management of moderate to severe pain.

**Contraindications**

Allergy to salicylates or other NSAIDs,.

Patients with history of asthma.

Bleeding disorders, especially GI related (peptic ulcer disease).

Renal failure.

**Adverse Reactions**

Anaphylaxis due to hypersensitivity.

Nausea, GI bleeding, Sedation, hypotension or hypertension, rash, headache, edema.

**Drug Interactions**

May increase bleeding time in patients taking anticoagulants.

**How supplied**

15 or 30 mg in 1 ml or 60 mg in 2 ml vials.

**Dosage and Administration**

**Adult: 30-60 mg IM.**

**Pediatric: Not recommended.**

**Duration of Action**

Onset: 10 minutes.

Peak effect: 1-2 hours.

Duration: 2-6 hours.

**Special Considerations**

Pregnancy safety: Category C.

Use with caution in elderly patient.

May be given IV in lower dosage (15-30 mg).



**LABETALOL (NORMODYNE, TRANDATE)****Class**

Selective Alpha and non-selective beta adrenergic blocker.

**Mechanism of Action**

Blood presser reduced without reflex tachycardia; total peripheral resistance reduced without significant alteration in cardiac output.

**Indications**

Moderate to severe hypertension.

**Contraindications**

Bronchial asthma.

CHF, Cardiogenic Shock.

Second and third-degree heart block, bradycardia.

**Adverse Reactions**

Headache, dizziness, ventricular dysrhythmias, hypotension, dyspnea, facial flushing.

postural hypotension, diaphoresis, allergic reaction.

**Drug Interactions**

Labetalol may block bronchodilator effects of beta-adrenergic agonists.

NTG may augment hypotensive effects of Labetalol.

**Dosage and Administration**

**Adult: 5-20 mg slow IV over 2 minutes; (additional injections of 10-40 mg can be given at 10 minute intervals); Infusion: 2 mg / min. titrated to acceptable supine blood pressure.**

**Pediatric: safety not established.**

**Duration of action:**

Onset: less than 5 minutes.

Peak effect: variable.

Duration: 3-6 hours.

**Special Considerations**

Pregnancy safety: Category C.

Continuous monitoring of BP, Heart Rate and ECG.

Observe for signs of CHF, Bradycardia, bronchospasm.

Should only be administered with patient in supine position.

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## **LACTATED RINGERS**

**Class:** Isotonic crystalloid

**Mechanism of Action:** Volume Replacement

**Indications:** Hypovolemic Shock

**Contraindications:** Congestive Heart failure, Renal Failure

**Adverse Reactions:** Rare

**Drug Interactions:** None

**HOW SUPPLIED:** IV INFUSION

**Dosage and Administration:**

**Adult:** (Systolic <90 mmHG) Infuse wide open until systolic pressure of 100mmHG is obtained.

(Systolic 100 or > infuse at a rate of 100 ml/hr.

**Pedi:** 20 ml/kg repeated as required based on hemodynamic response

**LIDOCAINE HCL (2%)****Class**

Antidysrhythmic.

**Mechanism of Action**

Decreases automaticity by slowing the rate of spontaneous Phase 4 depolarization.

**Indications**

Suppression of ventricular dysrhythmias (V-tach, VF, PVCs).

Prophylaxis against recurrence after conversion from V-tach, VF.

**Contraindications**

Second degree and third degree blocks in absence of artificial pacemaker).

Hypotension.

Stokes Adams Syndrome.

**Adverse Reactions**

Slurred speech, seizures, altered mental status, confusion, lightheadedness, blurred vision, bradycardia.

**Drug Interactions**

Apnea induced with succinylcholine may be prolonged with high doses of Lidocaine.

Cardiac depression may occur in conjunction with IV Dilantin.

Procainamide may exacerbate the CNS effects.

Metabolic clearance decreased in patients with liver disease or those patients taking beta-blockers.

**How Supplied**

100 mg in 5 ml solution prefilled syringes.

1 and 2 gram additive syringes.

100 mg in 5 ml solution ampules.

1 and 2 gram vials in 30 ml of solution.

**Dosage and Administration****Adult:**

**Cardiac arrest VT/ VF: 1.5 mg / kg IV push; repeat q 3-5 minutes to maximum dose of 3 mg/kg. After conversion to NSR, begin drip at 2-4 mg / min.**

**VT with pulse: 1-1.5 mg / kg IV Push; then 0.50 - 0.75 mg / kg q 5-10 min. to max. of 3 mg/kg. Start drip at 2-4 mg/min. ASAP.**

**PVCs with pulse: 0.5-1.5 mg/kg IV Push; additional boluses of 0.5-1.5 mg/kg q 5-10 min. to max. of 3 mg/kg. Start drip at 2-4 mg/ min. ASAP.**

**VF prophylaxis: 0.5 mg/kg IV Push; additional boluses 0.5 mg/kg in 8-10 minutes up to 2 mg/kg. Start drip at 2-4 mg/min. ASAP.**

**IM dose: 300 mg (4 mg/kg) of 10% solution.**

**Pediatric:**

**VF or Pulseless V-tach: 1 mg/kg IV / IO per dose. Infusion: 20-50 mcg/kg/min.**

**PVCs with pulse: 1 mg/kg IV / IO per dose. Infusion: 20-50 mcg/kg/min.**

**Duration of Action**

Onset: 1-5 minutes.

Peak Effect: 5-10 minutes.

Duration: Variable. (15 min. - 2 hours).

**LIDOCAINE HCL (2%) (cont.)****Special Considerations**

Pregnancy safety: Category B.

Reduce maintenance infusions by 50% if patient is over 70 years of age, has liver disease, or is in CHF or shock.

A 75-100 mg bolus maintains levels for only 20 minutes.

If bradycardia occurs with PVCs, always treat the bradycardia with atropine, Isoproterenol or both.

Exceedingly high doses of Lidocaine can result in coma or death.

Avoid Lidocaine for reperfusion dysrhythmias after thrombolytic therapy.

Cross-reactivity with other forms of local anesthetics.

**LORAZEPAM (ATIVAN)****Class**

Benzodiazepine; sedative; anticonvulsant.

**Mechanism of Action**

Anxiolytic, anticonvulsant and sedative effects; suppresses propagation of seizure activity produced by foci in cortex, thalamus and limbic areas.

**Indications**

Initial control of status epilepticus or severe recurrent seizures.

Severe anxiety.

Sedation.

**Contraindications**

Acute narrow-angle glaucoma.

Coma, shock or suspected drug abuse.

**Adverse Reactions**

Respiratory depression, apnea, drowsiness, sedation, ataxia, psychomotor impairment, confusion.

Restlessness, delirium.

Hypotension, bradycardia.

**Drug Interactions**

May precipitate CNS depression if patient is already taking CNS depressant medications.

**How Supplied**

2 and 4 mg / ml concentrations in 1 ml vials.

**Dosage and Administration**

**Note: When given IV or IO, must dilute with equal volume of sterile water or sterile saline; When given IM, Lorazepam is not to be diluted.**

**Adult: 2-4 mg slow IV at 2 mg / min. or IM; may repeat in 15-20 minutes to maximum dose of 8 mg. For sedation: 0.05 mg / kg up to 4 mg IM.**

**Pediatric: 0.05 - 0.20 mg / kg slow IV, IO slowly over 2 minutes or IM; may repeat in 15-20 minutes to maximum dose of 0.2 mg / kg.**

**Duration**

Onset of action: 1-5 minutes.

Peak effect: variable.

Duration of action: 6-8 hours.

**Special Considerations**

Pregnancy safety: Category D.

Monitor BP and respiratory rate during administration.

Have advanced airway equipment readily available.

Inadvertent arterial injection may result in vasospasm and gangrene.

Lorazepam expires in 6 weeks if not refrigerated.

**Note From Drug Control Program: Re: Storage of Lorazepam.**

According to stability information, Lorazepam injection requires refrigeration and should be stored at 2 - 8° C (35 - 45° F). Lorazepam injection should be protected from light, which can be accomplished by retaining the vial in the carton until ready for use. In addition, freezing of the injection should be avoided. Lorazepam should not be used if the solution is discolored or contains a precipitate.

Ambulances are required to ensure stability of all drug products stored on site. Those ambulances unable to meet the above-mentioned storage conditions should refrain from using Lorazepam. For further information, contact the Drug Control Program at (617) 983-6700 or the Office of Emergency Medical Services at (617) 284-8300.

**MAGNESIUM SULFATE****Class**

Electrolyte.

**Mechanism of Action**

Reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholinesterase release at the myoneural junction; manages seizures in toxemia of pregnancy; induces uterine relaxation; can cause bronchodilation after beta-agonists and anticholinergics have been used.

**Indications**

Seizures of eclampsia (Toxemia of pregnancy).  
Torsades de Pointes.  
Hypomagnesemia.  
TCA overdose-induced dysrhythmias.  
Digitalis-induced dysrhythmias.  
Class IIa agent for refractory VF and VT after administration of Lidocaine doses.

**Contraindications**

Heart blocks.  
Renal diseases.

**Adverse Reactions**

Respiratory and CNS depression.  
Hypotension, cardiac arrest and asystole may occur.  
Facial flushing, diaphoresis, depressed reflexes.  
Circulatory collapse.

**Drug Interactions**

May enhance effects of other CNS depressants.  
Serious changes in overall cardiac function may occur with cardiac glycosides.

**How Supplied**

2 ml and 20 ml vials of a 50% solution.

**Dosage and Administration**

**Adult: Seizure activity associated with pregnancy: 1-4 gm IV push over 3 minutes. For Torsades de Pointes or Refractory VF/VT: 1-2 grams IV push over 1-2 minutes.**

**Pediatric: Not recommended.**

**Duration of Action**

Onset: Immediate.  
Peak effect: variable.  
Duration: 3-4 hours.

**Special Considerations**

Pregnancy safety: Recommended that drug not be given in the 2 hours before delivery, if possible.  
IV calcium gluconate or calcium chloride should be available as antagonist if needed.  
The "cure" for toxemia is delivery of the baby.  
Use with caution in patients with renal failure.  
Magnesium sulfate is being used for acute MI patients in some systems under Medical Direction.

**MANNITOL 20% (OSMITROL)****Class**

Osmotic diuretic.

**Mechanism of Action**

Promotes the movement of fluid from the intracellular space to the extracellular space.

Decreases cerebral edema and intracranial pressure.

Promotes urinary excretion of toxins.

**Indications**

Cerebral edema.

Reduce intracranial pressure for certain cause (space-occupying lesions).

Rhabdomyolysis (myoglobinuria).

Blood transfusion reactions.

**Contraindications**

Hypotension, renal failure, electrolyte depletion, dehydration, intracranial bleeding.

Severe CHF with pulmonary edema

hyponatremia.

**Adverse Reactions**

CHF, pulmonary edema, hypertension, nausea, vomiting, headache, seizures, chest pain, tachycardia.      Electrolyte depletion, dehydration, hypotension, sodium depletion.

**Drug Interactions**

May precipitate digitalis toxicity in when given concurrently.

**How Supplied**

250 ml and 500 ml of a 20% solution for IV infusion (200 mg / ml )

25% solution in 50 ml for slow IV push.

**Dosage and Administration**

**Adult: 0.50g - 2 g / kg IV infusion over 15-30 minutes; may repeat after 5 minutes if no effect.**

**Pediatric: 0.5 - 1g / kg / dose IV, IO infusion over 30-60 minutes; may repeat after 30 minutes if no effect.**

**Duration of Action**

Onset: 1-3 hours for diuretic effect; 15 minutes for reduction of intracranial pressure.

Peak effect: variable.

Duration: 4-6 hours for diuretic effect; 3-8 hours for reduction of ICP.

**Special Considerations**

Pregnancy safety: Category C.

May crystallize at temperatures below 7.8 degrees Centigrade.

In-line filter should always be used.

Effectiveness depends upon large doses and an intact blood-brain barrier.

Usage and dosages in emergency care are controversial.

**MEPERIDINE (DEMEROL)****Class**

Opioid Analgesic

**Mechanism of Action**

Synthetic opioid agonist that acts on opioid receptors to produce analgesia, euphoria, respiratory and physical depression; a schedule II drug with potential for physical dependency and abuse.

**Indications**

Analgesia for moderate to severe pain.

**Contraindications**

Hypersensitivity to narcotic agents.  
Diarrhea caused by poisoning.  
Patients taking MAOIs.  
During labor or delivery of a premature infant.  
Undiagnosed abdominal pain or head injury.

**Adverse Reactions**

Respiratory depression, sedation, apnea, circulatory depression, dysrhythmias, shock.  
Euphoria, delirium, agitation, hallucinations, visual disturbances, coma.  
Seizures, headache, facial flushing.  
Increased ICP, nausea, vomiting.

**Drug Interactions:**

Do not give concurrently with MAOIs (even with a dose in the last 14 days!).  
Exacerbates CNS depression when given with these medications.

**How Supplied**

50 / ml in 1 ml pre-filled syringes and Tubex.

**Dosage and Administration**

**Adult: 50-100 mg IM, SC or 25 - 50 mg slowly IV.**

**Pediatric: 1-2 mg / kg / dose IV, IO, IM, SC.**

**Duration of Action**

Onset: IM: 10-45 minutes; IV: immediate.  
Peak effect: 30-60 minutes.  
Duration: 2-4 hours.

**Special Considerations**

Pregnancy safety: Category C.  
Use with caution in patients with asthma and COPD.  
May aggravate seizures in patients with known convulsive disorders.  
Naloxone should be readily available as antagonist.



**METAPROTERENOL 5% (ALUPENT)****Class**

Sympathomimetic Bronchodilator.

**Mechanism of Action:**

Beta-2 Agonist acts directly on bronchial smooth muscle causing relaxation of the bronchial tree and peripheral vasculature.

**Indications**

Bronchial asthma.

Reversible bronchospasm secondary to bronchitis, COPD.

**Contraindications**

Tachydysrhythmias.

Hypersensitivity.

Tachycardias due to digitalis toxicity.

**Adverse Reactions**

Tachydysrhythmias, anxiety, nausea, vomiting, restlessness, apprehension, palpitations.

Hypotension, coughing, facial flushing, diaphoresis.

**Drug Interactions**

Other sympathomimetics may exacerbate cardiovascular effects.

MAOIs may potentiate hypotensive effects.

Beta blockers may antagonize metaproterenol.

**How Supplied**

MDI: 0.65 mg / dose/ spray (15 ml inhaler).

Solution: 5% Solution in bottles of 10 and 30 ml with calibrated dropper;

Alupent Inhalation solution Unit-Dose vial 0.4% or 0.6%.

**Dosage and Administration****Adult:**

**MDI: 2-3 inhalations every 3-4 hours (2 minutes between inhalations).**

**Inhalation solution 5%: Via HHN 0.2 - 0.3 ml diluted in 2.5 ml saline.**

**Inhalation solution unit-dose 0.4% or 0.6% vials: IPPB Device only: one vial /treatment.**

**Pediatric:**

**MDI: not recommended.**

**Inhalation Solution 5%: Age 6-12 years: 0.1-0.2 ml diluted in 3 ml saline.**

**Duration of Action**

Onset: 1 minute after inhalation.

Peak effect: 45 minutes.

Duration: 3-6 hours.

**Special Considerations**

Pregnancy safety: category C.

Monitor for hypotension or tachycardia.

Use with caution in patients with Diabetes mellitus and coronary artery disease.

**METHYLPREDNISOLONE (SOLU-MEDROL)****Class**

Anti-inflammatory glucocorticoid.

**Mechanism of Action**

Synthetic steroid that suppresses acute and chronic inflammation; potentiates vascular smooth muscle relaxation by beta-adrenergic agonists;

**Indications**

Acute Spinal cord trauma.  
Anaphylaxis  
Bronchodilator for unresponsive asthma.

**Contraindications**

Premature infants.  
Systemic fungal infections.  
Use with caution patients with GI bleeding.

**Adverse Reactions**

Headache, hypertension, sodium and water retention.  
CHF, hypokalemia, alkalosis, peptic ulcer disease, nausea, vomiting.

**Drug Interactions**

Hypoglycemic responses to insulin and hypoglycemic agents may be blunted.  
Potassium-depleting agents may exacerbate hypokalemic effects.

**How Supplied**

40, 125, 500 and 1,000 mg vials.

**Dosage and Administration**

**Adult:** Acute spinal cord injury: 30 mg / kg IV over 30 minutes followed by infusion: 5.4 mg/kg/hr. Asthma, COPD: 1-2 mg / kg IV.

**Pediatric:** Acute spinal cord trauma: 30 mg / kg IV over 30 minutes; infusion: 5.4 mg / kg / hr. Asthma: 1-2 mg / kg / dose IV.

**Duration of Action**

Onset of action: 1-2 hours.  
Peak effects: Variable.  
Duration of action: 8-24 hours.

**Special Considerations**

Pregnancy safety: not established.  
Not effective if spinal cord injury greater than 8 hours.  
Crosses the placenta and may cause fetal harm.

**METOPROLOL (Lopressor, Toprol-XL )**

**Class:** Antianginal; Antihypertensive Agent; Beta Blocker

**Mechanism of Action:** Selective inhibitor of beta<sub>1</sub>-adrenergic receptors; completely blocks beta<sub>1</sub> receptors , with little or no effect on beta<sub>2</sub> receptors at doses <100 mg;

**Indications:** Treatment of hypertension and angina pectoris; prevention of myocardial infarction, atrial fibrillation, flutter, symptomatic treatment of hypertrophic subaortic stenosis; to reduce increased sympathetic stimuli in acute MI.

**Contraindications:** Hypersensitivity to metoprolol or any component of the formulation; sinus bradycardia; heart block greater than first degree (except in patients with a functioning artificial pacemaker); cardiogenic shock; uncompensated cardiac failure; pregnancy (2nd and 3rd trimesters)

**Adverse Reactions:**

**Respiratory:** Bronchospasm

**Cardiovascular:** Bradycardia, palpitations, edema, congestive heart failure, reduced peripheral circulation.

**Central nervous system:** Drowsiness, insomnia.

**Drug Interactions:** Drugs which slow AV conduction (**digoxin**): effects may be additive with beta-blockers.

**Glucagon:** Metoprolol may blunt the hyperglycemic action of glucagon. **Verapamil or diltiazem** may have synergistic or additive pharmacological effects when taken concurrently with beta-blockers; avoid concurrent I.V. use.

**How Supplied:** Metoprolol tartrate, is a selective beta<sub>1</sub>-adrenoreceptor blocking agent, available as 50- and 100-mg tablets for oral administration and in 5-ml (1mg/ml) ampuls for intravenous administration.

**Dosage and Administration:**

**Adults:**

**I.V.: Hypertension:** Has been given in dosages 1.25-5 mg every 6-12 hours in patients unable to take oral medications

**Myocardial infarction (acute):** I.V.: 5 mg every 5-10 minutes up to 3 doses in early treatment of myocardial infarction.

**Duration of Action:** Peak antihypertensive effect:

Oral: Within 1.5-4 hours

Duration: 10-20 hours

Half-life: 3-4 hours; End-stage renal disease: 2.5-4.5 hours

**Special Considerations:**

Pregnancy Safety: Category C (manufacturer); D (2nd and 3rd trimesters - expert analysis)

Not recommended in pediatric population. The safety and effectiveness of Lopressor have not been established in children

**MIDAZOLAM (VERSED)****Class**

Short-acting benzodiazepine CNS depressant.

**Mechanism of Action**

Anxiolytic and sedative properties similar to other benzodiazepines.

Memory impairment.

**Indications**

Sedation, Anxiolytic prior to endotracheal or nasotracheal intubation.

Administer for conscious sedation.

**Contraindications**

Glaucoma, shock, coma, alcohol intoxication, overdose patient.

Depressed vital signs.

Concomitant use with other CNS depressants, barbiturates, alcohol, narcotics.

**Adverse Reactions**

Hiccough, cough, over-sedation, nausea, vomiting, injection site pain, headache, blurred vision.

Hypotension, respiratory depression and arrest.

**Drug Interactions**

Should not be used in patients who have taken CNS depressant.

**How Supplied**

2, 5, 10 ml vials (1 mg / ml ).

1, 2 , 5, 10 ml vials (5 mg/ ml ).

**Dosage and Administration**

**Adult:** 0.5 - 2.5 mg slow IV push;

(may be repeated to total maximum: 0.1 mg / kg).

**Pediatric:** To facilitate intubation: Medical control may order:

(6 months- 5 years) Use of Midazolam (Versed) 0.05-0.1 mg/kg IV maximum dose of 5 mg.

(6-12 year old) Use of Midazolam (Versed) 0.1 mg/kg IV maximum dose of 8 mg.

**WMD:** (See APPENDIX Dosing Table)

**Duration of Action**

Onset: 1-3 minutes IV and dose dependent.

Peak effect: variable.

Duration: 2-6 hours and dose dependent.

**Special Considerations**

Pregnancy safety: category D.

Administer immediately prior to intubation procedure.

Requires continuous monitoring of respiratory and cardiac function.

Never administer as IV bolus.

**MORPHINE SULFATE (ASTRAMORPH/PF AND OTHERS)****Class**

Opioid analgesic. (Schedule II drug).

**Mechanism of Action**

Alleviates pain through CNS actions

Suppresses fear and anxiety centers in brain.

Depresses brain stem respiratory centers.

Increases peripheral venous capacitance and decreases venous return.

Decreases preload and afterload, decreasing myocardial oxygen demand.

**Indications**

Analgesia for moderate to severe acute and chronic pain (use with caution).

Severe CHF, pulmonary edema.

Chest pain associated with acute MI.

**Contraindications**

Head injury, exacerbated COPD, depressed respiratory drive, hypotension.

Undiagnosed abdominal pain, decreased level of consciousness.

Suspected hypovolemia.

Patients who have taken MAOIs within past 14 days.

**Adverse Reactions**

Respiratory depression, hypotension, decreased level of consciousness, nausea, vomiting.

Bradycardia, tachycardia, syncope, facial flushing, euphoria, bronchospasm, dry mouth.

**Drug Interactions**

Potentiates sedative effects of phenothiazines.

CNS depressant may potentiate effects of morphine.

MAOIs may cause paradoxical excitation.

**How Supplied**

10 mg in 1 ml of solution, ampules and Tubex syringes.

**Dosage and Administration**

**Adult: 1-3 mg IV, IM, SC every 5 minutes titrated to maximum of 10 mg.**

**Adult: Morphine 0.1mg/kg to a maximum of 10mg IV/IM/SC**

~

**Pediatric: 0.1 - 0.2 mg / kg / dose IV, IO, IM, SC every 5 minutes titrated to max. of 5 mg.**

**Duration of Action**

Onset: Immediate.

Peak effect: 20 minutes.

Duration: 2 - 7 hours.

**Special Considerations**

Pregnancy safety: Category C.

Morphine rapidly crosses the placenta.

Safety in neonate not established.

Use with caution in geriatric population and those with COPD, asthma.

Vagotonic effect in patient with acute inferior MI (bradycardia, heart block).

Naloxone should be readily available as antidote.

**NALBUPHINE (NUBAIN)****Class**

Opioid analgesic.

**Mechanism of Action**

Activates opiate receptor in limbic system of CNS.

Analgesic similar to morphine on a milligram for milligram basis.

Agonist and antagonist properties.

May be preferred for chest pain in setting of acute MI as it reduces the myocardial oxygen demand without reducing the blood pressure.

**Indications**

Chest pain associated with acute MI.

Moderate to severe acute pain.

Pulmonary edema, with or without associated chest pain. (morphine remains first line).

**Contraindications**

Head injury or undiagnosed abdominal pain.

Diarrhea caused by poisoning.

Hypovolemia, hypotension.

**Adverse Reactions**

Hypotension, bradycardia, facial flushing.

Respiratory depression, CNS depression, euphoria, paradoxical CNS stimulation.

Blurred vision.

**Drug Interactions**

CNS depressant may potentiate effects.

**How Supplied**

10 mg in 1 ml ampule (10 mg / ml ).

20 mg in 1 ml ampule.

**DOSAGE AND ADMINISTRATION**

**Adult: 2-5 mg slowly IV; may repeat 2 mg doses PRN to maximum 10 mg.**

**Pediatric: Not recommended.**

**Duration of Action**

Onset: 2-3 minutes.

Peak effect: variable.

Duration: 3-6 hours.

**Special Considerations**

Pregnancy safety: Category B.

Use with caution in patients with impaired respiratory function.

May precipitate withdrawal syndromes in narcotic-dependent patients.

Naloxone should be readily available.

**NALOXONE (NARCAN)****Class**

Narcotic antagonist.

**Mechanism of Action**

Competitive inhibition at narcotic receptor sites.

Reverse respiratory depression secondary to depressant drugs.

Completely inhibits the effect of morphine.

**Indications**

Opiate overdose, coma.

Complete or partial reversal of CNS and respiratory depression induced by opioids

Narcotic agonist

Morphine, heroin, hydromorphone (Dilaudid), methadone.

Meperidine (Demerol), Paregoric, Fentanyl (Sublimase).

Oxycodone (Percodan), codeine, propoxyphene (Darvon).

Narcotic agonist and antagonist

Butorphanol (Stadol).

Pentazocine (Talwin).

Nalbuphine (Nubain).

Decreased level of consciousness.

Coma of unknown origin.

**Contraindications**

Use with caution in narcotic-dependent patients.

Use with caution in neonates of narcotic-addicted mothers.

**Adverse Reactions**

Withdrawal symptoms in the addicted patient.

Tachycardia, hypertension, dysrhythmias, nausea, vomiting, diaphoresis.

**Drug Interactions**

Incompatible with bisulfite and alkaline solutions.

**How Supplied**

0.02 mg / ml (neonate); 0.4 mg/ml, 1 mg/ml ; 2.0 mg / 5 ml ampules; 2 mg/5 ml prefilled syringe.

**Dosage and Administration**

**Adult: 0.4 - 2.0 mg IV, IM, SC, or ET (diluted); min. recommended = 2.0 mg.; repeat at 5 minute intervals to 10 mg maximum dose. (Medical Control may request higher amounts). Infusion: 2 mg in 500 ml of D5W (4 mcg/ml), infuse at 0.4 mg / hr (100 ml/hour).**

**Pediatric: 0.1 mg / kg / dose IV, IM, SC, ET (diluted); maximum of 0.8 mg; if no response in 10 minutes, administer an additional 0.1 mg / kg /dose.**

**Duration of Action**

Onset: within 2 minutes.

Peak effect: variable.

Duration: 30-60 minutes.

**Special Considerations**

Pregnancy safety: category B.

Seizures without causal relationship have been reported.

May not reverse hypotension.

Use caution when administering to narcotic addicts (violent behavior, etc.).

**NERVE AGENT ANTIDOTES (AUTO-INJECTORS)****1. MARK 1 KIT: Nerve Agent Antidote Kit**

Each **MARK 1 KIT** contains 1- Atropine, (2 mg/0.7 ml) and 1- Pralidoxime Chloride (600-mg/2 cc) (2-PAMCL)

**2. DIAZEPAM AUTO-INJECTOR: CONVULSANT ANTIDOTE NERVE AGENT (CANA):** Each **CANA Autoinjector** contains 10mg diazepam in 2ml.

Meridian Medical Technologies, Inc.



**NERVE AGENT ANTIDOTES (AUTO-INJECTORS)**

**3. Pediatric AtroPen® Autoinjector:** Three strengths of ATROPEN are available in color coded containers: 0.5mg (blue); 1.0mg (Dark Red) or 2.0 mg (Green) Each ATROPEN delivers atropine in in 0.7 ml. of sterile solution.

Adults and children weighing over 90 lbs (generally over 10 years of age) 2 mg AtroPen® (GREEN LABEL)
Children weighing 40 lbs to 90 lbs (generally 4 to 10 years of age) 1 mg AtroPen® (DARK RED LABEL)
Children weighing 15 lbs to 40 lbs (generally 6 months to 4 years of age) 0.5 mg AtroPen® (BLUE LABEL)



Meridian Medical Technologies, Inc.

**Intramuscular** solution from 1 gram vial of pralidoxime chloride (2-PAM). 3 ml of sterile water or normal saline for a concentration of 300 mg/ml.

**Intravenous:** 1 gram vial of pralidoxime (2-PAM) diluted with 20 ml of sterile water or normal saline. Add to 100 ml IV bag of normal saline. Adult dosing is 1 gram infused over at least 30 minutes. More rapid dosing is associated with hypertension and paralysis. Slow infusion if hypertension develops.

**PREPARATION OF WEIGHT BASED DOSING USING MARK I KITS**

Under sterile conditions, clean 10 ml sterile water or sterile saline vial top with isopropyl alcohol. Withdraw entire contents of vial and discard. Swab injection surface of the autoinjector with isopropyl alcohol while autoinjector is still in protective plastic safety case to prevent inadvertent firing. Remove autoinjector and firmly press autoinjector against surface of emptied sterile vial until all contents are discharged. Label vial as atropine or pralidoxime. One vial will now contain 2 mg atropine in 0.7 ml diluent (2.9 mg/ml) and the other has 600 mg pralidoxime in 2ml diluent (300 mg/ml). The pediatric dose should then be drawn up in a syringe with a filter needle (autoinjector may discharge a plug of rubber into the vial) and needle changed for injection.

**NITROGLYCERIN (NITROSTAT, TRIDIL AND OTHERS)****Class**

Vasodilators.

**Mechanism of Action**

Smooth muscle relaxant acting on vascular, bronchial, uterine and intestinal smooth muscle.

Dilation of arterioles and veins in the periphery, reduces preload and afterload, decreases the work load of the heart and, thereby, myocardial oxygen demand.

**Indications**

Acute angina pectoris.

Ischemic chest pain.

Hypertension.

CHF, pulmonary edema.

**Contraindications**

Hypotension, hypovolemia.

Intracranial bleeding or head injury.

**Adverse Reactions**

Headache, hypotension, syncope, reflex tachycardia, flushing.

Nausea, vomiting, diaphoresis, muscle twitching.

**Drug Interactions**

Additive effects with other vasodilators.

Incompatible with other drugs IV.

**How Supplied**

Tablets: 0.15 mg (1/400 grain); 0.3 mg (1/200 grain); 0.4 mg (1/150 grain); 0.6 mg (1/100 grain).

NTG spray: 0.4 mg - 0.8 mg under the tongue.

NTG IV (TRIDIL).

**Dosage and Administration****Adult:**

**Tablets: 0.3 - 0.4 mg SL; may repeat in 3-5 minutes to maximum of 3 doses.**

**NTG spray: 0.4 mg under the tongue; 1-2 sprays.**

**NTG IV infusion: 5 ug / min.; increase by 5-10 ug / min. every 5 minutes until**

**desired effect.**

**Pediatric: not recommended.**

**Duration of Action**

Onset: 1-3 minutes.

Peak effect: 5-10 minutes.

Duration: 20-30 minutes or, if IV, 1-10 minutes after discontinuation of infusion.

**Special Considerations**

Pregnancy safety: category C.

Hypotension more common in geriatric population.

NTG decomposes if exposed to light or heat.

Must be kept in airtight containers.

Active ingredient may have a stinging effect when administered SL.

**NITROPASTE (Nitro-Bid, Nitrol OINTMENT)**

**Class:** Vasodilator

**Mechanism of Action:** Smooth muscle relaxant acting on vascular, bronchial, uterine and intestinal smooth muscle. Dilation of arterioles and veins in the periphery, reduces preload and afterload, decreases the work load of the heart and, thereby, myocardial oxygen demand.

**Indications:** Angina pectoris and chest pain associated with acute MI, CHF/PE;  
Hypertension (HTN).

**Contraindications:** Hypotension, hypovolemia, Intracranial bleeding or head injury.

**Adverse Reactions:** Headache, hypotension, syncope, reflex tachycardia, flushing.  
Nausea, vomiting, diaphoresis, muscle twitching.

**How Supplied: Topical Ointment: (Nitrol â )** 2% [20 mg/g] (30g, 60g)

**Dosage and Administration**

**Adult: For CHF/PE; HTN**

**Paste:** Apply 1 inch, cover with plastic wrap and secure with tape.

**Pediatric: not recommended.**

**Duration of Action**

Onset: 30 minutes.

Peak effect: Variable.

Duration: 18-24 hours.

**Special Considerations**

Pregnancy safety: Category C.

Apply in thin uniform layer on non-hairy area.

1 inch equals approximately 15 mg nitroglycerin.

Avoid using fingers to spread paste.

Store past in cool place with tube tightly capped.

Erratic absorption rates quite common.

**NITROUS OXIDE: OXYGEN (50:50), (NITRONOX)****Class**

Gaseous analgesic and anesthetic.

**Mechanism of action**

Exact mechanism unknown; effects CNS phospholipids.

**Indications**

Moderate to severe pain.

Anxiety, apprehension.

**Contraindications**

Impaired level of consciousness, head injury, inability to comply with instructions.

Decompression sickness (nitrogen narcosis, air embolism, air transport).

Undiagnosed abdominal pain or marked distention, bowel obstruction.

Hypotension, shock, COPD (with history / suspicion of CO<sub>2</sub> retention).

Cyanosis.

Chest trauma with pneumothorax.

**Adverse Reactions**

Dizziness, apnea, expansion of gas-filled pockets.

Cyanosis, nausea, vomiting, malignant hyperthermia, drowsiness, euphoria.

**Drug Interactions**

None of significance.

**How Supplied**

D and E cylinders (blue and green); of 50% Nitrous Oxide and 50% oxygen compressed gas.

**Dosage and Administration**

**Adult: (Note: Invert cylinder several times before use); Instruct the patient to inhale deeply through demand valve and mask or mouthpiece.**

**Pediatric: Same as adult.**

**Duration of Action**

Onset: 2-5 minutes.

Peak effect: Variable.

Duration: 2-5 minutes.

**Special Considerations**

Pregnancy safety: Nitrous oxide increases the incidence of spontaneous abortion.

Ventilate patient area during use.

Nitrous oxide is a non-flammable and non-explosive gas.

Nitrous oxide is ineffective in 20 % of the population.

**NOREPINEPHRINE (LEVOPHED, LEVARTERENOL)****Class**

Sympathomimetic.

**Mechanism of Action**

Potent alpha agonist resulting in intense vasoconstriction; positive chronotrope and increased inotrope (from 10% beta effects) with increased cardiac output.

**Indications**

Cardiogenic shock.

Neurogenic shock.

Inotropic shock.

**Contraindications**

Hypotensive patients with hypovolemia.

Pregnancy (relative contraindication).

**Adverse Reactions**

Headache, dysrhythmias, tachycardia, reflex bradycardia.

Angina pectoris, hypertension.

Decreased blood flow to GI tract, kidneys, skeletal muscle and skin.

**Drug Interactions**

Can be deactivated by alkaline solutions

Sympathomimetics and phosphodiesterase inhibitors may exacerbate dysrhythmias.

**How Supplied**

1 mg / ml, 4 ml ampules.

**Dosage and Administration**

**Adult:** Dilute 8 mg in 500 ml of D5W or 4 mg in 250 ml of D5W (16 mg / ml);

**Infuse by IV piggyback at 0.5 - 1.0 mcg / minute, titrated to patient response.**

**Pediatric:** 0.1 - 1.0 mcg / minute IV infusion, titrated to patient response.

**Duration of Action**

Onset: 1-3 minutes.

Peak effect: Variable.

Duration: 5-10 minutes and last only 1 minute after infusion discontinued.

**Special Considerations**

Pregnancy safety: not established.

May cause fetal anoxia when used in pregnancy.

Must be infused through large stable vein to avoid tissue necrosis. (antidote: local phentolamine injection).

Often used with low-dose dopamine to spare renal and mesenteric blood flow.

**OXYGEN****Class**

Naturally occurring atmospheric gas.

**Mechanism of Action**

Reverses hypoxemia.

**Indications**

Confirmed or expected hypoxemia.

Ischemic chest pain.

Respiratory insufficiency.

Prophylactically during air transport.

Confirmed or suspected carbon monoxide poisoning.

All other causes of decreased tissue oxygenation.

Decreased level of consciousness.

**Contraindications**

Certain patients with COPD, emphysema who will not tolerate Oxygen concentrations over 35%.

Hyperventilation.

**Adverse Reactions**

Decreased level of consciousness and respiratory depression in patients with chronic CO<sub>2</sub> retention.

Retrolental fibroplasia if given in high concentrations to premature infants. (maintain 30-40% O<sub>2</sub>)

**Drug Interactions**

None.

**How Supplied**

Oxygen cylinders (usually green and white) of 100% compressed oxygen gas).

**Dosage and Administration****Adult:**

**Cardiac arrest and Carbon Monoxide poisoning: 100%.**

**Hypoxemia: 10-15 L/ min. via non-rebreather.**

**COPD: 0-2 L/ min. via nasal cannula or 28-35% venturi mask. Be prepared to provide ventilatory support if higher concentrations of oxygen needed.**

**Pediatric: Same as for adult with exception of premature infant.**

**Duration of Action**

Onset: Immediate.

Peak effect: not applicable.

Duration: Less than 2 minutes.

**Special Considerations**

Be familiar with liter flow and each type of delivery device used.

Supports possibility of combustion.

**OXYTOCIN (PITOCIN)****Class**

Hormone.

**Mechanism of Action**

Increases uterine contractions

**Indications**

Postpartum hemorrhage after infant and placental delivery.

**Contraindications**

Presence of second fetus.

Unfavorable fetal position.

Hypersensitivity.

**Adverse Reactions**

Hypotension, hypertension, tachycardia, dysrhythmias, angina pectoris.

Anxiety, seizures, nausea, vomiting, uterine rupture.

Anaphylaxis.

**Drug Interactions**

Other vasopressors may potentiate hypertension.

**How Supplied**

10 USP units / 1 ml ampule (10 U/ml) and prefilled syringe.

5 USP units / 1 ml ampule (5 U/ml) and prefilled syringe.

**Dosage and Administration**

**IM Administration: 3-10 units after delivery of placenta.**

**IV Administration: Mix 5020 units in 500 ml of D5W, NS, or LR: Infuse at 20-40 milliunits / min., titrated to severity of bleeding and uterine response.**

**Duration of Action**

Onset: IM: 3-5 minutes; IV: Immediate.

Peak Effect: Variable.

Duration: IM; 30-60 minutes; IV: 20 minutes after infusion discontinued.

**Special Considerations**

Pregnancy safety: not applicable.

Monitor Vital Signs, including fetal heart rate and uterine tone closely.

**PANCURONIUM (PAVULON)****Class**

Nondepolarizing neuromuscular blocker / paralytic.

**Mechanism of Action**

Binds to the receptor for acetylcholine at the neuromuscular junction.

**Indications**

Induction or maintenance of paralysis after intubation to assist ventilations.

**Contraindications**

Hypersensitivity.

Inability to control airway and support ventilations with oxygen and positive pressure.

Neuromuscular disease (myasthenia gravis).

Hepatic or renal failure.

**Adverse Reactions**

Apnea, weakness, salivation, PVCs, tachycardia.

Transient hypotension, increased blood pressure.

Pain, burning at injection site.

**Drug Interactions**

Positive chronotropic drugs may potentiate tachycardia.

**How Supplied**

4 mg / 2 ml ampule.

**Dosage and Administration**

**Adult: 0.1 mg / kg slow IV; repeat every 30 - 60 minutes PRN.**

**Pediatric: 0.1 mg / kg slow IV, IO.**

**Duration of Action**

Onset: 30 seconds.

Peak Effect: Paralysis in 3-5 minutes.

Duration: 45-60 minutes.

**Special Considerations**

Pregnancy safety: not established.

If patient is conscious, explain the effect of the medication before administration and always sedate the patient before using pancuronium.

Intubation and ventilatory support must be readily available.

Monitor the patient carefully.

Effects may be reversed with neostigmine (Prostigmin) 0.05 mg / kg and should be accompanied by atropine (0.5-1.2 mg IV).

Pancuronium has no effect on consciousness or pain.

Will not stop neuronal seizure activity.

Heart rate, cardiac output are increased.

Decrease doses for patients with renal disease.



**PHENOBARBITAL (LUMINAL)****Class**

Barbiturate, anticonvulsant

**Mechanism of Action**

Generally unknown but believed to reduce neuronal excitability by increasing the motor cortex threshold to electrical stimulation.

**Indications**

Prevention and treatment of seizure activity..

Prophylaxis for febrile seizures.

Anxiety, apprehension.

Status epilepticus.

**Contraindications**

Patients with porphyria.

Hypersensitivity.

Sever liver or respiratory diseases.

**Adverse Reactions**

Respiratory depression, hypotension, coma, bradycardia, nausea, vomiting.

CNS depression, ataxia, nystagmus, pupillary constriction.

Burning at injection site.

**Drug Interactions**

Effects potentiated by other CNS depressants, anticonvulsants and MAOIs.

Incompatible with all other drugs; flush line before and after use.

**How Supplied**

Elixir: 20 mg / 5 ml/

Tablets: 8, 15, 30, 60, 90 , 100 mgs.

Parenteral: 65 mg, 130 mg / ml ampule; dose may be diluted with 9 ml of D5W (6.5, 13 mg // ml).

**Dosage and Administration**

**Adult: 100-250 mg slow IV, or IM; may repeat as needed in 20-30 minutes.**

**Pediatric: 10-20 mg / kg IV, IO, (less than 1 mg/kg/min.) or IM; repeat as needed in 20-30 minutes.**

**Duration of Action**

Onset: 3-30 minutes.

Peak effect: 30 minutes

Duration: 4-6 hours.

**Special Considerations**

Pregnancy safety: Category B.

Potential for abuse.

Carefully monitor vital signs.

Use with caution in patients with pulmonary, cardiovascular, hepatic, or renal insufficiency.

Use a large, stable vein for injection.

**PHENYTOIN (DILANTIN)**

**Class** Anticonvulsant.

**Mechanism of Action**

Promotes sodium efflux from neurons, thereby stabilizing the neuron's threshold against excitability caused by excess stimulation; in similar fashion, decreases abnormal ventricular automaticity and decreases the refractory period in the myocardial conduction system.

**Indications**

Prophylaxis and treatment of major motor seizures.  
Digitalis-induced dysrhythmias.

**Contraindications**

Hypersensitivity.  
Bradycardia.  
Second and third-degree heart block.

**Adverse Reactions**

Hypotension with too rapid IV push.  
Heart block, dysrhythmias, cardiovascular collapse.  
Nausea, vomiting, ataxia, CNS depression, nystagmus.  
Pain at injection site.  
Respiratory depression.

**Drug Interactions**

Serum Dilantin levels increased by: anticoagulants, tagamet, sulfonamides, salicylates.  
Metabolism increased by chronic alcohol usage.  
Cardiac depressant effects increased by Lidocaine, propranolol and other beta blockers.  
Precipitation may occur when mixed with D5W.  
Incompatible with many solutions and medications.

**How Supplied:**

50 mg / ml in 2- and 5- ml ampules, 2 ml prefilled syringes.  
May be diluted in NS (1-10 mg / ml); use in-line filter.

**NOTE:** IV line should be flushed with 0.9% NS before and after drug administration.

**Dosage and Administration****Adult:**

**Seizures:** 10-20 mg / kg slow IV, not to exceed 1 gram or rate of 50 mg/min.).

**Dysrhythmias:** 50-100 mg (diluted) slow IV every 5-15 min. PRN; max. = 1 gram.

**Pediatric:**

**Seizures:** 10-20 mg / kg slow IV (1-3 mg/kg/min.).

**Dysrhythmias:** 5 mg / kg slow IV; max. = 1 gram.

**Duration of Action**

Onset: 20-30 minutes for seizure disorder  
Peak effect: 1-3 hours.  
Duration: 18-24 hours but as long as 15 days reported.

**Special Considerations**

Pregnancy safety: not established.  
Carefully monitor vital signs.  
Venous irritation may occur (use large stable vein).

**PRALIDOXIME CHLORIDE (2-PAM CHLORIDE, PROTOPAM)****Class**

Cholinesterase reactivator.

**Mechanism of Action**

Reactivation of cholinesterase to effectively act as an antidote to organophosphate pesticide poisoning. This action allows for destruction of accumulated acetylcholine at the neuromuscular junction.

**Indications**

As an antidote in the treatment of poisoning by organophosphate pesticides and chemicals.

In the pre-hospital arena, is used when atropine is or has become ineffective in management of organophosphate poisoning.

**Contraindications**

Use with caution in patients with reduced renal function.

Patients with myasthenia gravis and organophosphate poisoning.

**Adverse Reactions**

Dizziness, blurred vision, diplopia, headache, drowsiness, nausea, tachycardia, hyperventilation, muscular weakness, excitement and manic behavior

**Drug Interactions**

No direct drug interactions, however, patients with organophosphate poisoning should not be given barbiturates, morphine, theophylline, aminophylline, succinylcholine, reserpine and phenothiazines.

**How Supplied**

Emergency Single Dose Kit containing:

One 20 ml vial of 1 gram sterile Protopam Chloride.

One 20 ml ampule of sterile diluent.

Sterile, disposable 20 ml syringe.

Needle and alcohol swab.

**Dosage and Administration**

**NOTE: If Protopam is to be used, it should be administered almost simultaneously with atropine.**

Adult: Initial dose of 1-2 grams as an IV infusion with 100 ml saline over 15-30 minutes.

Pediatric: 20-40 mg / kg as IV infusion over 15-30 minutes.

Doses may be repeated every 1 (one) hour if muscle weakness persists.

If IV administration is not feasible, IM or SC injection may be utilized.

**Duration of Action**

Onset: Minutes

Peak effects: Variable.

Duration: Variable

**Special Considerations**

Pregnancy safety: unknown.

Treatment will be most effective if given within a few hours after poisoning.

Cardiac monitoring should be considered in all cases of severe organophosphate poisoning.

**PROCAINAMIDE (PRONESTYL)****Class**

Antidysrhythmic Class Ia.

**Mechanism of Action**

Suppresses phase IV depolarization in normal ventricular muscle and Purkinje fibers, reducing automaticity of ectopic pacemakers; suppresses reentry dysrhythmias by slowing intraventricular conduction.

**Indications**

Suppress PVCs refractory to Lidocaine.

Suppress VT with a pulse refractory to Lidocaine.

PSVTs with wide-complex tachycardia of unknown origin (drug of choice when associated with WP).

**Contraindications**

Second and Third Degree block.

Torsades de Pointes.

Lupus.

Digitalis toxicity.

Myasthenia gravis.

**Adverse Reactions**

PR, QRS, and QT widening, AV Block, cardiac arrest, hypotension, seizures.

Nausea, vomiting, reflex tachycardia, PVCs, VT, VF.

CNS depression, confusion.

**Drug Interaction**

None with other emergency drugs.

**How Supplied**

1 gram in 10 ml vial (100 mg / ml).

1 gram in 2 ml vials (500 mg / ml) for infusion.

**Dosage and Administration**

**Adult: 20-30 mg / min.; maximum total dose is 17 mg / kg. Maintenance infusion: 1-4 mg / min.**

**Pediatric: 2-6 mg / kg IV, IO at less than 20 mg / min.; maximum dose is 17 mg / kg. Maintenance infusion: 20-80 micrograms/kg/min.**

**Duration of Action**

Onset: 10-30 minutes.

Peak effect: Variable.

Duration: 3-6 hours.

**Special Considerations**

Discontinue infusion if hypotension develops, the QRS complex widens by 50% of its original width or a total of 17 mg / kg has been administered or if the dysrhythmia is suppressed.

Pregnancy safety: Category C.

Potent vasodilating and inotropic effects.

Hypotension with too rapid an infusion.

Carefully monitor vital signs and ECG.

Administer cautiously to patients with renal, hepatic or cardiac insufficiency.

Administer cautiously to patients with asthma or digitalis-induced dysrhythmias.

**PROMETHAZINE (PHENERGAN)****Class**

Antihistamine.

**Mechanism of Action**

H-1 Receptor antagonist; blocks action of histamine; possesses sedative, anti-motion, antiemetic and anticholinergic activity; potentiates the effects of narcotics to induce analgesia.

**Indications**

Nausea, vomiting, motion sickness.  
Sedation for patient in labor.  
Potentiation of analgesic effects of narcotics.

**Contraindications**

Hypersensitivity.  
Coma, CNS-depressed patients from alcohol, barbiturates, narcotics.  
Reye's Syndrome.

**Adverse Reactions**

Sedation, dizziness, impairment of mental and physical ability.  
Dysrhythmias, nausea, vomiting, hyperexcitability.  
Hallucinations, convulsions and sudden death when used in children.

**Drug Interactions**

Additive with other CNS depressants.  
Increased extrapyramidal effects with MAOIs.

**How Supplied**

25 and 50 mg / ml in 1 ml ampules and Tubex syringes.

**Dosage and Administration**

**Adult: 12.5 -25.0 mg IV or deep IM.**  
**Pediatric: 0.5 - 1.0 mg / kg / dose IM.**

**Duration of Action**

Onset: IV: immediate.  
Peak effect: 30-60 minutes.  
Duration: 4-6 hours.

**Special Considerations**

Pregnancy safety; Category C.  
Use cautiously in patients with asthma, peptic ulcer disease and bone marrow suppression.  
Do not use in children with vomiting of unknown etiology.  
Avoid intraarterial injection.  
IM injection is preferred route.

**PROPRANOLOL (INDERAL)****Class**

Beta-adrenergic blocker, antidysrhythmic (Class II).

**Mechanism of Action**

Non-selective beta-adrenergic blocker that inhibits chronotropic, inotropic and vasodilator response to beta-adrenergic stimulation.

**Indications**

Hypertension, angina pectoris,  
VT and VF refractory to Lidocaine.  
Selected Supraventricular tachycardias.

**Contraindications**

Sinus bradycardia, second or third degree AV block.  
Asthma, CHF, COPD.

**Adverse Reactions**

Bradycardia, heart blocks, angina pectoris, palpitations, syncope.  
Bronchospasm, dyspnea, hallucinations, anxiety, nausea, vomiting, visual disturbances.

**Drug Interactions**

Verapamil may worsen AV conduction abnormalities.  
Succinylcholine effects may be enhanced.  
Effects may be reversed by isuprel, norepinephrine, dopamine.

**How Supplied**

Solution of 1 mg / ml vials.

**Dosage and Administration**

**Adult: Dilute 1-3 mg in 10-30 ml of D5W; administer slowly IV at rate of 1 mg/min.; max. = 5 mg.**

**Pediatric: 0.01-0.05 mg / kg /dose slow IV over 10 minutes; maximum dose 3 mg.**

**Duration of Action**

Onset: 15-60 minutes.  
Peak effect: Variable.  
Duration: 6-12 hours.

**Special Considerations**

Pregnancy safety: Category C.  
Closely monitor patient during administration.  
Use cautiously in geriatric population.  
Atropine should be readily available.

**SODIUM BICARBONATE 8.4%**

**Class** Buffer, alkalinizer.

**Mechanism of Action**

Reacts with hydrogen ions to form water and carbon dioxide thereby acting as a buffer for metabolic acidosis.

**Indications**

Known pre-existing bicarbonate-responsive acidosis.

Upon return of spontaneous circulation after long arrest interval.

TCA overdose.

Hyperkalemia.

Phenobarbital overdose.

Alkalinization for treatment of specific intoxications.

**Contraindications**

Metabolic and respiratory alkalosis.

Hypocalcemia and hypokalemia.

Hypocloremia secondary to GI loss and vomiting.

**Adverse Reactions**

Metabolic alkalosis, hypokalemia, hyperosmolarity, fluid overload.

Increase in tissue acidosis.

Electrolyte imbalance and tetany, seizures.

Tissue sloughing at injection site.

**Drug Interactions**

May precipitate in calcium solutions.

Half-lives of certain drugs may increase through alkalinization of the urine.

Vasopressors may be deactivated.

**How Supplied**

50 mEq in 50 ml of solvent.

**Dosage and Administration**

**Adult: 1 mEq / kg IV; may repeat with 0.5 mEq / kg every 10 minutes.**

**Pediatric: same as for adult.**

**Adult infusion:** 1 – 4 amps in 1 litre D5W or NS, rate determined by sending physician.

**Pediatric infusion: same as for adult.**

**Duration of Action**

Onset: 2-10 minutes.

Peak effect: 15-20 minutes.

Duration: 30-60 minutes.

**Special Considerations**

Pregnancy safety: Category C.

Must ventilate patient after administration.

Whenever possible, blood gas analysis should guide use of bicarbonate.

Intracellular acidosis may be worsened by production of carbon dioxide.

May increase edematous states.

May worsen CHF.

**STREPTOKINASE (STREPTASE)**

**Class** Thrombolytic agent.

**Mechanism of Action**

Combines with plasminogen to produce an activator complex that converts free plasminogen to the proteolytic enzyme plasmin. Plasmin degrades fibrin threads as well as fibrinogen, causing clot lysis.

**Indications**

Acute evolving MI.  
Massive pulmonary emboli.  
Arterial thrombosis and embolism.  
To clear arteriovenous cannulas.

**Contraindications**

Hypersensitivity.  
Active bleeding, recent surgery (within 2-4 weeks), recent CVA.  
Prolonged CPR.  
Intracranial or intraspinal neoplasm, arteriovenous malformation or surgery.  
Recent significant trauma (particularly head trauma).  
Uncontrolled hypertension.

**Adverse Reactions**

Bleeding (GU, GI, intracranial, other sites).  
Allergic reactions, hypotension, chest pain.  
Reperfusion Dysrhythmias.  
Abdominal pain.

**Drug Interactions**

Aspirin may increase risk of bleeding as well as improve outcome..  
Heparin and other anticoagulants may increase risk of bleeding as well as improve outcome.

**How Supplied**

250,000, 750,000, 1.5 Million IU vials.

**Dosage and Administration**

**NOTE: Reconstitute by slowly adding 5 ml sodium chloride or D5W, directing stream to side of vial instead of into powder. Gently roll and tilt vial for reconstitution; Dilute slowly to 45 ml total.**

**Adult: 500,000 - 1,500,000 IU diluted to 45 ml IV over one (1) hour.**

**Pediatric: safety not established.**

**Duration of Action**

Onset: 10 - 20 minutes. (fibrinolysis 10-20 minutes; clot lysis: 60 - 90 minutes).  
Peak effects: Variable.  
Duration: 3-4 hours (prolonged bleeding times up to 24 hours).

**Special Considerations**

Pregnancy safety: Category A.  
Do not administer IM injections to patients receiving thrombolytics.  
Obtain blood sample for coagulation studies prior to administration.  
Carefully monitor vital signs.  
Observe patient for bleeding.



**SUCCINYLCHOLINE (ANECTINE)****Class**

Depolarizing neuromuscular blocker, paralyzing agent.

**Mechanism of Action**

Bind to the receptors for acetylcholine.

**Indications**

- To facilitate intubation.
- To terminate laryngospasm.
- To promote muscle relaxation.
- To facilitate electroconvulsive shock therapy.

**Contraindications**

- Acute narrow angle glaucoma.
- Penetrating eye injuries.
- Inability to control airway or support ventilations with oxygen and positive pressure.

**Adverse Reactions**

- Apnea, malignant hyperthermia, dysrhythmias, bradycardia, hypertension, hypotension, cardiac arrest.
- Hyperkalemia, increased intraocular pressure, fasciculations.
- Exacerbation of hyperkalemia in trauma patients.

**Drug Interactions**

- Effects potentiated by Oxytocin, beta blockers and organophosphates.
- Diazepam may reduce duration of action.

**How Supplied**

- 40 mg in 2 ml ampule (20 mg / ml).
- 100 mg in 5 ml ampule (20 mg / ml).
- Multidose vial.

**Dosage and Administration**

- Adult: 1-2 mg / kg rapid IV; repeat once if needed.**
- Pediatric: 1 - 1.5 mg / kg dose rapid IV, IO.; repeat once if needed.**

**Duration of Action**

- Onset: 1 minute.
- Peak effect: 1-3 minutes.
- Duration: 5 minutes.

**Special Considerations**

- Pregnancy safety: Category C.
- EMS use primarily to facilitate endotracheal intubation.
- If the patient is conscious, explain the effects of the drug before administration.
- Consider premedication with atropine, particularly in pediatric age group.
- Premedication with Lidocaine may blunt any increase in intracranial pressure during intubation.
- Diazepam or midazolam should be used in any conscious patient undergoing neuromuscular blockade.

## **TERBUTALINE (BRETHINE)**

### **Class**

Sympathomimetic bronchodilator.

### **Mechanism of Action**

Selective beta-2 adrenergic receptor activity resulting in relaxation of smooth muscles of the bronchial tree and peripheral vasculature. Minimal cardiac effects.

### **Indications**

Bronchial asthma.

Reversible bronchospasm associated with exercise, chronic bronchitis, and emphysema.

### **Contraindications**

Hypersensitivity.

Tachydysrhythmias.

### **Adverse Reactions**

Usually transient and dose-related, restlessness, apprehension, palpitations, tachycardia.

Chest pain, coughing, bronchospasm, nausea, facial flushing.

### **Drug Interactions**

Cardiovascular effects exacerbated by other sympathomimetics.

MAOIs may potentiate dysrhythmias.

Beta blockers may antagonize terbutaline.

### **How Supplied**

MDI: 200 mcg / metered spray.

Parenteral: 1 mg / ml ampule.

### **Dosage and Administration**

**Adult: 0.25 mg SC; may repeat in 15-30 minutes to maximum dose of 0.5 mg in 4 hours period. 400 mcg (two inhalations by MDI) every 4-6 hours; allow 1-2 minutes between inhalations.**

**Pediatric: Not recommended for children under 12 years of age. 0.01 mg / kg / dose SC every 15-20 minutes PRN to maximum 0.25 mg dose. 0.03 - 0.05 mg / kg in 1.25 ml saline for aerosolization every 4 hours.**

### **Duration of action**

Onset: SC: 15-30 minutes; MDI 5-30 minutes.

Peak effect: Variable.

Duration: SC: 1.5-4 hours; MDI: 3-6 hours.

### **Special Considerations**

Pregnancy safety: Category B.

Carefully monitor vital signs.

Use with caution in patients with cardiovascular disease or hypertension.

Patient should receive oxygen before and during bronchodilator administration.

**TETRACAINE (PONTOCAINE®)**

**Class:** Local Anesthetic

**Mechanism of Action:** Blocks the initiation and conduction of nerve impulses

**Indications:** Topically applied local anesthetic for eye examination

**Contraindications:** Hypersensitivity to ester anesthetics; Not to be applied in large amounts or to Infants of less than 1 year old.

**Adverse Reactions:** 1-10% Dermal: Angioedema, burning, contact dermatitis, stinging.  
< 1% : Methemoglobinemia in infants

**How Supplied:** Ophthalmic: 0.5% [5mg/ml] (1ml, 2ml, 15ml)

**Dosage and Administration:**

**Adult:** Ophthalmic Solution: Instill 1-2 drops

**Pediatric:** Safety and efficacy have not been established.

**Kinetics:**

Onset: Within 60 seconds.

**Special Considerations**

Pregnancy category C

Storage Store in a light resistant container

Stability: Lasts 6 months refrigerated; Lasts 4 weeks at room temperature:  
Discard if solution discolors (should be clear)

**Caution** in Child < 6 years old

## THIAMINE

### Class

Vitamin (B1)

### Mechanism of Action

Combines with ATP to form thiamine pyrophosphate coenzyme, a necessary component for carbohydrate metabolism. The brain is extremely sensitive to thiamine deficiency.

### Indications

Coma of unknown origin.  
Delirium tremens.  
Beriberi.  
Wernicke's encephalopathy.

### Contraindications

None

### Adverse Reactions

Hypotension from too rapid injection or too high a dose.  
Anxiety, diaphoresis, nausea, vomiting.  
Rare allergic reaction.

### Drug Interactions

Give thiamine before glucose under all circumstances.

### How Supplied

1,000 mg in 10 ml vial (100 mg / ml).

### Dosage and Administration

**Adult: 100 slow IV or IM.**

**Pediatric: 10-25 mg slow IV or IM.**

### Duration of Action

Onset: Rapid.  
Peak effects: variable.  
Duration: Dependent upon degree of deficiency.

### Special Considerations

Pregnancy safety: Category A.  
Large IV doses may cause respiratory difficulties.  
Anaphylaxis reactions reported.

**TISSUE PLASMINOGEN ACTIVATOR (T-PA, RECOMBINANT ALTPEPLASE)****Class**

Thrombolytic agent.

**Mechanism of Action**

Binds to fibrin-bound plasminogen at the clot site, converting plasminogen to plasmin. Plasmin digests the fibrin strands of the clot restoring perfusion.

**Indications**

Acute evolving myocardial infarction.  
Massive pulmonary emboli.  
Arterial thrombosis and embolism.  
To clear arteriovenous cannulas.

**Contraindications**

Recent surgery (within three weeks).  
Active bleeding, recent CVA, prolonged CPR,, intracranial or intraspinal surgery.  
Recent significant trauma, especially head trauma.  
Uncontrolled hypertension (generally BP over 200 mm Hg.).

**Adverse Reactions**

GI, GU intracranial and other site bleeding.  
Hypotension, allergic reactions, chest pain, abdominal pain, CVA.  
Reperfusion dysrhythmias.

**Drug Interactions**

Acetylsalicylic acid may increase risk of hemorrhage.  
Heparin and other anticoagulants may increase risk of hemorrhage.

**How Supplied**

20 mg with 20 ml diluent vial.  
50 mg with 50 ml diluent vial.

**Dosage and Administration**

**Adult: 10 mg bolus IV over 2 minutes; then 50 mg over one hour, then 20 mg over the second hour and 20 mg over the third hour for a total dose of 100 mg. (other doses may be prescribed through Medical Direction.**  
**Pediatric: safety not established.**

**Duration of Action**

Onset: clot lysis most often within 60-90 minutes.  
Peak effect: variable.  
Duration: 30 minutes with 80% cleared within 10 minutes.

**Special Considerations**

Pregnancy safety: contraindicated.  
Closely monitor vital signs.  
Observe for bleeding.  
Do not give IM injection to patient receiving T-PA.

**VECURONIUM (NORCURON)**

**Class** Paralytic agent.

**Mechanism of Action**

Non-depolarizing neuromuscular blocking agent, paralytic.

**Indications**

- To facilitate intubation.
- To terminate laryngospasm.
- To promote muscle relaxation.
- To facilitate electroconvulsive shock therapy.

**Contraindications**

- Acute narrow angle glaucoma.
- Penetrating eye injuries.
- Inability to control airway or support ventilations with oxygen and positive pressure.
- Newborns.
- Myasthenia gravis.
- Hepatic or renal failure.

**Adverse Reactions**

- Apnea, weakness, salivation, PVCs, tachycardia.
- Transient hypotension, increased blood pressure.

**Drug Interaction**

Use of inhalational anesthetics will enhance neuromuscular blockade.

**How Supplied**

- 10 mg / 10 ml vecuronium bromide vials with diluent.
- 20 ml vials (20 mg vecuronium) without diluent.

**Dosage and Administration**

**Adult: 0.1 mg / kg IV Push; maintenance dose within 25-40 minutes: 0.01 - 0.05 mg/kg IV push.**

**Pediatric: 0.1 mg / kg IV, IO. maintenance dose within 20-35 minutes: 0.01- 0.05 mg/kg IV push.**

**Duration of Action**

- Onset: 30 seconds.
- Peak effects: 2..5 - 3.0 minutes.
- Duration: 25-30 minutes.

**Special Considerations**

- Pregnancy safety: Category C.
- If patient is conscious, explain the effect of the medication before administration and always sedate the patient before using vecuronium.
- Intubation and ventilatory support must be readily available.' Monitor the patient carefully.
- Vecuronium has no effect consciousness or pain.
- Will not stop neuronal seizure activity.
- Heart rate, cardiac output are increased.
- Decrease doses for patients with renal disease.

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